MEASURING MINDFULNESS IN MEDITATORS AND EXAMINING HOW ASPECTS OF MEDITATION PRACTICE AFFECT MINDFULNESS

A Dissertation

by

KATHERINE JANE LEINBERGER

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Approved by:

Chair of Committee,	Daniel F. Brossart
Committee Members,	Michael Duffy
	Arnold LeUnes
	William Rae
Head of Department,	Victor Willson

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ABSTRACT

Mindfulness is an element of consciousness which has historically been associated with well-being. Mindfulness-based clinical interventions intend on reducing cognitive vulnerability to emotional distress and have produced promising results. Such endeavours however rest upon the dissent that remains among researchers on how to operationally define the construct. Measuring mindfulness in a valid and reliable manner is an essential part of scientific enquiry and facilitates the effort to define the construct. This study examines three newer self-report mindfulness instruments; Five Facet Mindfulness Questionnaire (FFMQ), the Toronto Mindfulness Scale (TMS) and the Experiences Questionnaire (EQ). A sample of non-meditators (Texas A&M University students; *n* =141) and meditators (non-clinical population from Bay Area, California; *n* =157) with a wide range of meditation experience completed the instruments. Multiple correlations allowed for an in-depth examination of the measures at full-scale and sub-scale level and all yielded significant and positive relations. Regression analyses established that meditation does increase mindfulness scores as measured by the FFMQ, TMS and EQ. Sub-scales FFMQ Observe, FFMQ Non React and TMS Decenter increased most of the combined eight facets; while FFMQ Describe and FFMQ Aware increased least. Lastly, the study examined how various aspects of meditation practice affect total mindfulness. Aspects of practice included: Number of sittings per week (sit/wk); time spent per meditation sitting (time/med); how long the participant has engaged in formal meditation (how long) and style of meditation (style). Meditation

styles were grouped into the following categories; 1) Mindfulness, Vipassana, Zen and Shambhala; 2) Concentration and Transcendental; 3) Blend and 4) “I don’t know”. “Sit/wk”, “how long” and “style” were predictive of total mindfulness, with “how long” being the strongest predictor. All the mindfulness facets were predicted by meditation style except for FFMQ Observe, FFMQ Describe and TMS Curiosity. Meditation styles mindfulness, Vipassana, Zen and Shambhala were associated with the highest mindfulness scores.

DEDICATION

To my mother & father,

there isn't anything they wouldn't do for their kids.

Thank you.

To my brother & sister-in law,

Who've housed, fed and clothed me during the slog.

Dave Eadie, who also believed deeply in the power of presence.

My quiet companion, always.

To the Texas A&M faculty who believed in me.

My sister, Lucinda Alden, who kick-started this PhD.

Michelle Hoogenhout, my new friend, there when I most needed her.

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CHAPTER I

INTRODUCTION

Mindfulness can be cultivated by paying attention in a specific way, that is, in the present moment, as non-judgmentally, non-reactively and open-heartedly as possible

(Jon Kabat-Zinn, 2005, p. 105)

Traditionally clinical psychology has focused on the diagnosis and treatment of mental disorders, while more recently scientific interest has tuned in to a deeper understanding of positive mental well being (Seligman & Csikszentimihalyi, 2001). This shift of focus has brought the construct *mindfulness* to the forefront of scientific thinking. While interest in mindfulness dates back to early psychologists, including William James (Stanley, 2012), the topic subsequently fell between desks, as it failed to fit neatly into any one research arena; philosophy, psychology, religion or medical science. This neglect could in part be attributed to the fact that the study of mindfulness and its effects present challenges to popular Western cultural attitudes, and to some established paradigms in psychology that emphasize the primacy of the ego, or the constructed self, as the appropriate guiding force for human behaviour (Brown, Ryan, & Cresswell, 2007). However, more recently mindfulness-based clinical interventions have produced impressive results (e.g., Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010; Davidson et al., 2003), and the topic quietly demanded, received and continues to receive new-found attention. For example, a simple search of the scientific literature on PsycINFO (American Psychological Association, Washington, DC) using the keyword, "mindfulness" results in over 13,000 findings. Resources have been allocated to

mindfulness-related projects. For example President Barack Obama has backed a grant worth 2.5 million to federally fund researching mindfulness. Furthermore, a wide range of international medical and mental health care and corporate environments include mindfulness interventions in their standard practice.

The academic literature reveals dissent among researchers on how to conceptualize mindfulness, in particular, whether it represents a distinct construct or merely a quality of consciousness that spans and incorporates other states (Chambers, Lo, & Allen, 2008). Mindfulness is fundamentally a quality of consciousness and except among intrepid bands of philosophically oriented psychologists and cognitive scientists, consciousness has received relatively little attention in psychological scholarship, research, and clinical practice (Brown et al., 2007). Buddhist literature presents a very detailed description of the nature of mindfulness, though interestingly, even Buddhist literature and scholars are themselves, not always in complete agreement about the precise definition of mindfulness (Grossman, 2008). Psychologists and health care providers have struggled to integrate eastern material in a "smooth" manner, though Shapiro (2009) emphasizes the importance of finding ways of translating its non-conceptual, non-dual, and paradoxical nature into a language that clinicians, scientists and scholars can understand and agree on.

Hayes and Plump (2007) describe the psychological literature on mindfulness as too diffuse and "a fool's errand" because the term is pre-scientifically and loosely defined. There is considerable variance in descriptions of the nature of mindfulness on both theoretical and operational levels (Dimidjian & Linehan, 2003; Hayes & Wilson,

2003). For example, depending on the context, mindfulness refers to a psychological process, a type of meditation practice, and a theoretical concept (Brown et al., 2007; Germer, 2005). The construct has been described as a self regulatory capacity (Brown & Ryan, 2003), an acceptance skill (Linehan, 1993), and a meta cognitive skill (Bishop, et al., 2004). Other authors have conceptualized mindfulness to be a cognitive ability, a cognitive style or a psychological trait (Sternberg, 2000). Grossman (2008) summarized that mindfulness is sometimes described as a state of mind, a trait of mind, a particular type of mental process, or the method for cultivating any or all of the preceding categories and suggests that there are reasonable arguments for each position. The debate on the meaning of mindfulness is a good one. Grossman (2008) suggests that simplifying the matter could risk an erroneous reductionism that would in no way correspond to the original Buddhist construct of mindfulness. No doubt, there is a clear need for conceptual agreement on the meaning of mindfulness. Such agreement would not only to facilitate communication about the construct, but most pragmatically, would also create a stable platform for basic and applied research in this still young area of investigation (Brown et al., 2007).

Most psychometric studies have been concerned with the efficacy of mindfulness training on various outcomes (e.g., reducing psychological problems associated with medical illnesses) and have not verified whether mindfulness-based interventions in fact increase mindfulness (Shapiro, Bootzin, Figueredo, Lopez, & Schwartz, 2003). Specifically, there has been a lack of rigorous investigation in the form of randomized controlled trials and basic research on mindfulness mechanisms (Bishop et al., 2004).

However, a consistent assumption in the literature is that mindfulness is a skill or a type of mental training that can be developed with practice (Bishop et al., 2004; Kabat-Zinn, 2003). Recent studies indicate that self-reported mindfulness increased following mindfulness training (Anderson, Lau, Segal, & Bishop, 2007; Carmody, Reed, Kristeller, & Merriam, 2008) and evidence is emerging that the effectiveness of the mindfulness intervention is meditated by degree of mindfulness (Carmody & Baer, 2008; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008). Several authors have suggested that clarifying those processes requires psychometrically sound measures for assessing mindfulness (Baer, Smith, & Allen, 2004; Bishop et al., 2004; Brown & Ryan, 2004; Dimidjian & Linehan, 2003). Brown and Ryan (2004) and Bishop et al. (2004) made similar points, arguing that operational definitions of mindfulness are essential for the development of valid instruments, which in turn are necessary for investigating the psychological processes involved in mindfulness training.

Statement of Purpose

As the psychological community debates the meaning of the construct, researchers have engaged in developing and publishing at least a half-dozen self-rating mindfulness questionnaires. The instruments set to measure mindfulness provide inconsistent definitions, with self-report scales ranging in complexity from one factor (Brown & Ryan, 2003; Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006) to five (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006). The primary intention of this project is to facilitate the study of mindfulness by contributing to the psychometric literature. More specifically, it examines the relationship between three

newly developed measures of mindfulness. These measures include the Five Facet Mindfulness Questionnaire (FFMQ; Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; see appendix F), the Toronto Mindfulness Scale (TMS; Lau et al., 2006, see appendix G) and the Experiences Questionnaire (EQ; Fresco et al., 2007, see appendix H) and their respective abilities to measure change in mindfulness due to meditation experience. Furthermore, the study examines how the sub-scales of mindfulness, as measured by the respective instruments, change relative to the amount of meditation experience. Lastly, the project examines different aspects or habits of meditation practice and how they affect overall mindfulness. Aspects examined include style of meditation practiced, the number of meditation sittings per week, length of meditation per sitting and lifetime hours of meditation practiced.

CHAPTER II

LITERATURE REVIEW

After introducing the historical context of the construct mindfulness, this review outlines the published literature addressing mindfulness. In particular, it seeks to define and conceptualize the construct by drawing upon Buddhist philosophy and empirical research. Next, because the construct is elusive and hard to articulate, the nuances of mindfulness are explored providing the reader with a more detailed analysis of the process of being mindful. The review then explores the relationship of mindfulness to already established and related psychological theories and constructs. The published salutary effects of mindfulness are reviewed (mental health and well-being, cognitive, neurological and physical health-related improvements). The chapter introduces the respective mindfulness-based clinical interventions and differentiates them from more traditional treatments. The major contemplative and meditation styles are also briefly introduced. *Decentering*-the essential ingredient of mindfulness is detailed, as are other proposed mechanisms of mindfulness. Empirical explorations that address the current vulnerabilities of existing subjective, self-report measures are reviewed, as are recent efforts to compliment current psychometric measures with objective methods of assessing mindfulness. Lastly, the review briefly addresses the scant attention paid to cross-cultural considerations as they pertain to this topic.

The Scope of Mindfulness

While the concept of mindfulness is most firmly rooted in Buddhist psychology, its phenomenological nature is embedded in most religious and spiritual traditions, as well as Western philosophical and psychological schools of thought (Walsh, 2000; Brown & Cordon, 2009). Furthermore, it shares conceptual kinships with ideas advanced by a variety of philosophical traditions, including ancient Greek philosophy, phenomenology, existentialism, and naturalism in later western European thought; and transcendentalism, and naturalism in America (Brown et al., 2007). The same authors explain that the predominance of the topic through history supports the understanding that mindfulness is central to the human experience.

In Buddhist tradition, mindfulness occupies a central place in a system designed to lead to the cessation of mental suffering (Thera, 1992). Buddhist theory suggests that suffering originates in ignorance or delusion, and cessation is cultivated through wisdom that comes from clear seeing (Thera, 1992). In this understanding, ignorance/delusion comes from not clearly seeing the mental components and associations making up everyday perception and experience, resulting in the world not being seen as it truly (objectively) is (Carmody, 2009). Wisdom, in this sense, is experienced by a more direct experience of the process. Several authors (e.g. Grossman, 2008; Shapiro, 2009) have advised that the centuries –old Buddhist text be heavily referenced as scientific enquiry seeks to separate the essential and non-essential ingredients of mindfulness, as well as the antecedents and consequences of mindfulness.

Proposed Definitions

The main purpose of living mindfully is to be present to the moment, connected with the senses, not caught up with mental chatter, confronting situations with an attitude of acceptance and yet acting when one needs to act (Kostanski & Hassed, 2008). However, scientific enquiry requires that a construct be defined and operationalized so that it can be measured reliably and validly. As discussed earlier, mindfulness is subtle, elusive and somewhat difficult to define (Block-Lerner, Salters-Pedneault, & Tull 2005).

In Buddhist scriptures, a central feature of practice is that of "sati". Mindfulness has come to be the agreed upon translation of that word. Sati is a subtle construct and there is variation in Buddhist tradition as to what is included in an understanding of the term (Carmody, 2009). One interpretation suggests that a combination of sati and sampajan˜na as a whole can render awareness, circumspection, discernment, and retention (Shapiro, 2009). Bhikku Bodhi, a Theravadan scholar and monk, integrates these multiple definitions of mindfulness as meaning to remember to pay attention to what is occurring in one's immediate experience with care and discernment (Shapiro & Carlson, 2009; Wallace & Bodhi, 2006). Nyyanaponika Thera (1972) called mindfulness "the clear and single-minded awareness of what actually happens to us and in us at the successive moments of perception" (p. 5).

A comprehensive definition of mindfulness was proposed by Bishop and colleagues (2004) following a consensus conference. They proposed a two-faceted operational definition. The first facet of this definition of mindfulness is the capacity for the sustained self-regulation of attention so that an individual can remain engaged in the

present moment. The second facet addresses the capacity to maintain an acceptance and curiosity regarding all of one's thoughts, feelings, and sensations. Most simply, mindfulness is awareness of what is taking place in the present moment- in the body and mind as well as what is occurring in the external environment (Brown & Ryan, 2003). Brown and Ryan also explain that "mindfulness captures a quality of consciousness that is characterized by clarity and vividness of current experience and functioning and thus stands in contrast to the mindless, less "awake" states of habitual or automatic functioning that may be chronic for many individuals" (Brown & Ryan, 2003). Demick (2000) and Langer and Moldoveanu (2000) provide a slightly different perspective on the construct describing it as the process of drawing novel distinctions, which is believed to lead to heightened sensitivity to one's environment, openness to new information and the creation of new perceptual categories, and increased awareness of multiple perspectives when solving problems.

It can be seen from these various descriptions that mindfulness is a multifactoral construct and that different approaches to the practice and applications of mindfulness have led to differing operational definitions (Brown et al., 2007). Carmody (2009) warns that there remain a number of problems. First, different facets of mindfulness are emphasized in different Buddhist texts (Kass, 1991; Powell, Thoresen, & Shahabi, 2003) making it unclear as to what should be included in descriptions on mindfulness. Furthermore, debate exists as to whether mindfulness more appropriately refers to mental skills used in practice and cultivation or a resultant state/trait (Brown et al., 2007). Grossman (2008) warns that this variation should lead to caution in claiming that

one particular understanding of mindfulness may be considered "true" (Grossman, 2008). A second problem is that the multi-faceted descriptions of the construct, along with varying conceptions and understandings in the clinical literature, present challenges in exploring the pathways of its development (Carmody, Baer, Lykins, & Olendzki, 2009; Shapiro, Carlson, Astin, & Freedman, 2006). For these reasons, mindfulness may remain operationally elusive and the term itself unnecessarily complex for patients (Carmody, 2009).

Understanding Mindfulness

Johnson (2007) explained that some phenomena need to be experienced to be understood. The author went on to use the analogy of describing the taste of salt to someone who has never experienced salt. In such an instance, one would be inclined to define the taste of salt in reference to what it does not taste like, for example, salt does not taste sweet or sour. Similarly, Germer (2005) suggested that mindfulness has to be experienced to be known. However, a more detailed analysis of the process of being mindful facilitates an understanding of it.

The process of being mindful can be better understood by recognizing that raw awareness lasts a split second before a reactionary cognitive and emotional reaction transpires. Some might argue that even raw awareness is affected by cognitive and emotional reactions. Regardless, the consequence of such processing is that concepts, labels, ideas and judgments are often imposed, automatically, on everything that is encountered (e.g. Bargh & Chartrand, 1999). The aforementioned processing has adaptive benefits, relating to goal pursuit and attainment, maintenance of order upon

events and experience of relevance to the self (Brown et al., 2007). Hayes et al. (1999) note, that the cost of these adaptive mechanisms is that we do not merely live in the world, we live in the world as we view it, construct it, or interpret it.

Mindfulness is characterized by un-doing the typical reactionary, cognitive, and emotional reactions and registering the bare-bone facts. Such a process allows a prolonged initial contact with the external world, thereby allowing the individual to "be present" to reality as it is. For this reason, mindfulness has been termed "bare" attention (Engler, 1986; Gunaratana, 2002; Nyaniponika, 1973; Rahula, 1974) and "pure" or "lucid" awareness (Das, 1997; Gunaratana, 2002). A mindful mode does not compare, categorize, or evaluate, nor does it contemplate, introspect, reflect, or ruminate upon events or experiences based on memory (Brown & Ryan, 2003; Teasdale, 1999). When customary psychological reactions do transpire, such as thoughts, images and emotions, they too are regarded as objects of attention and awareness (Brown et al., 2007). These authors point out that mindfulness is not considered to be antithetical to thought, but rather fosters a different relationship to it.

As the nuances of mindfulness are explored, it is important to note that mindfulness states span a broad spectrum. Although awareness and attention to present events and experiences are given features of the human organism, these qualities can vary considerably, from heightened states of clarity and sensitivity, to low levels, as in habitual, automatic, mindless, or blunted thought or action (Wallace, 1999). For example, in a deep meditation or mindfulness practice a person is said to transcend, by which is meant that a person has a deep sense of resting in a simple state of awareness

without any concern, preoccupation, or identification with the state of the body and mind (Kostanski & Hassed, 2008). In such a state, one feels both detached and connected at the same time. Some traditions refer to this phenomenon as a state of "self-knowledge" which is said to foster a profound sense of peace, focus, presence, acceptance, letting go, insight, love, unity, and quiet happiness.

Paradoxically, this state is prevented by trying to make it happen. Instead, the purpose of mindfulness is to take a gentle step back from our attachment to sensations and feelings. In a deep state of mindfulness, awareness and consciousness observe mind and body dispassionately (Kostanski & Hassed, 2008). In this state, the mind is less restless, with increased lucidity. While this state can be attained in daily life, more commonly a person takes a taste of the aforementioned qualities with them as they engage in everyday activities.

Mindfulness has been associated with personality traits, in particular Openness to Experience (McCrae, 1992) and to aspects of emotional intelligence (Perceptual clarity: Salovey & Sanz, 1995). While the construct does appear to have close alignment with aspects of these processes, Brown and Ryan (2003) have argued that mindfulness also remains distinct from each, in that these processes define modes of reflexivity, whereas mindfulness is pre-flexive. Kostanski and Hassed (2008) suggest that mindfulness is at the interface between personality and cognition and represents a preferred way of thinking, meaning that mindfulness is a skill that can be learned.

Mindfulness is considered an inherent capacity of the human organism, but little is known about the genetic or developmental antecedents of individual differences in this

characteristic (Brown et al., 2007). Parasuraman and Greenwood (2004) identified specific genetic variants underlying individual differences in attentional capacities. Preliminary evidence has shown that dispositional mindfulness is associated with genetic variation in the monoaminergic system, particularly in the regulatory region of the monoamine oxidase A (MAOA) gene (Way, Creswell, Eisenberger, & Lieberman, 2006). Greennough and Black (1992) point out that the developmental trajectory of the mindful disposition is significantly influenced by the forces of socialization and culture, and is thus, a part of an outcome of experience-dependent development. While mindfulness-based interventions aim to explicitly cultivate mindfulness; mindfulness is a natural human capacity (Kabat-Zinn, 2003) as well as a skill that can potentially be cultivated through many diverse paths (Bishop et al., 2004).

Relating Mindfulness to Other Psychological Constructs

There are several psychological constructs that are sometimes described as components or elements of mindfulness (Block-Lerner et al., 2005; Dimijian & Linehan, 2003). Others, however argue that they are better understood as outcomes of practicing mindfulness (Bishop et al., 2004) or as skills that aid in fostering mindfulness (Brown et al., 2007). Regardless of which it is, research to date supports the claim that mindfulness is a unique construct (e.g. Brown & Ryan, 2003), but little is known about its convergence with other phenomena that appear to have conceptual overlap (Brown et al., 2007).

Awareness, attention and concentration

Mindfulness encompasses awareness, attention and concentration. According to Brown & Ryan (2003) *awareness* is the background monitoring system that observes internal and external stimuli. One may therefore be aware of a stimulus without that stimulus ever coming in to the centre of attention. In contrast, *attention* is a process of focusing conscious awareness, providing heightened sensitivity to a limited range of experience (Western, 1999). Mindfulness involves directing the attention in a deliberate and particular manner (Kabat-Zinn, 1994). The concept of "flow" (Csikszentmihalyi, 1990) relates to attention and to mindfulness as flow can be described as the total absorption in an activity for its own sake. Research based on the theoretical concept of flow demonstrates that happiness comes from deep attention and engagement in activity (Csikszentmihalyi, 1990).

Another key feature of mindfulness is the flexibility it affords. One is more able to consciously move back from particular states of mind to gain a larger perspective on what is taking place (clear awareness) and can also zero in on situational details (focused attention) according to inclination or circumstance (J.C. Bays, cited in Cullen, 2006; Welwood, 1996). This aspect of mindfulness is closely associated with attentional control and other indicators of concentrative capacity (Brown, 2006), but mindfulness and concentration are considered unique capacities, and some evidence supports this distinction (Dunn, Hartigan, & Mikulus, 1999). A primary difference between them is that concentration entails a restriction of attention to a single interoceptive or exteroceptive object, leading to a withdrawal of sensory and other inputs (Engler, 1986).

Mindfulness, however promotes a more intentional, fluid-like flexibility of attention and awareness.

Acceptance

An essential element of mindfulness is the way in which one attends to the present moment - attitude. A mindful mode is suggestive of a compassionate, curious, nonjudgmental stance of acceptance. Acceptance refers to a willingness to experience a wide range of internal experiences (such as emotions, cognitions and physical sensations) even when they are painful or distasteful. Engaging in unwanted experiences is particularly important when shunning such experiences invites harmful or counter-productive outcomes. The importance of this ability to be open to threatening information will be further discussed in the sub-section *Mindfulness-based Interventions*.

Possible Effects of Mindfulness: What the Evidence Shows

Mindfulness interventions have been reported to reduce symptoms across a wide range of populations and disorders (Baer, 2003; S.C. Hayes, Masuda, Bissett, Luoma, & Guerrero, 2004; Robins & Chapman, 2004) though it remains unclear as to exactly how and why the treatments attain such results. The content below addresses a range of human experiences seemingly affected by mindfulness-based interventions.

Mental health and well-being

Numerous studies suggest that mindfulness interventions can be an effective manner in which to treat depression and anxiety (Astin, 1997; Carmody & Baer, 2008; Kabat-Zinn et al., 1992; Miller, Fletcher, & Kabat-Zinn, 1995; Roth & Creaser, 1997, 2002; Shapiro, Schwartz, & Bonner, 1998; Teasdale et al., 2000). More specifically, a

study by Carmody, Reed, Kristeller and Merriam (2008) found that an 8-week course in Mindfulness-Based Stress Reduction (MBSR) (MBSR; Kabat-Zinn, 1990) reduced anxiety symptoms by 50% and other medical symptoms by 28%. These findings are consistent with other MBSR studies (Davis & Addis, 1999). Although these preliminary findings have generated a great deal of optimism, a recent review of randomized controlled trials of MBSR and adapted MBSR treatments suggests that collectively these interventions have equivocal effects on symptoms of anxiety and depression (Toneatto & Nguyen, 2007).

Regarding treatment of suicidal depression, in a study focused on understanding the effects of meta cognitive awareness and specificity of describing prodromal symptoms in suicidal depression, researchers found that mindfulness training may enable patients to reflect on memories of previous crises in a detailed and decentered way, allowing them to relate to such experiences in a way that is likely to be helpful in preventing future relapses (Hargus, Crane, Barnhofer, & Williams, 2010).

A study by Carmody & Baer (2008) gained a valuable perspective on how mindfulness decreases stress, anxiety and reduces pain. The study examined 121 participants engaging in an 8-week mindfulness training course. Per the researchers, the most interesting finding was that the change in mindfulness scores mediated the relationship between total home practice time (captured via homework logs) and degree of improvement in psychological functioning. The results therefore suggest that practicing mindful meditation increases people's psychological functioning because it increases the ability to observe internal experiences non-judgmentally and non-reactively

and brings awareness to daily life activities. Several studies (Baer et al., 2008; Carmody et al., 2009; Carmody & Baer, 2008; Lau et al., 2006) have reflected similar findings suggesting that changes in scores on mindfulness scales mediates the relationship between meditation practice and well-being.

Mindfulness has also been effective in increasing sleep quality (Shapiro, Bootzin, Lopez, Figuerodo, & Schwartz, 2003), and treating binge eating disorders (Kristeller & Hallett, 1999), borderline personality disorder (Linehan, 1993) and psychosis (e.g., Bach & Hayes, 2002; Chadwick, Taylor, & Abba, 2005). Additional research suggests that mindfulness related enhancements in self awareness, distress tolerance, and improved self-efficacy may promote relapse resistance of substance abuse (Britton, Bootzin, Cousins, Hasler, & Peck, 2010). High levels of mindfulness have also been shown to correlate inversely with dissociation, alexithymia, and general psychological distress (e.g., Baer et al., 2006).

More generally, high mindfulness scores have been shown to predict self-regulated behaviour and positive emotional states (Brown & Ryan, 2003) and improved psychological well-being (e.g. Baer et al., 2008). Mindfulness interventions have also been shown to decrease perceived stress and promote self-compassion (Shapiro, Astin, Bishop, & Cordova, 2005), improve acceptance (Orzech, Shapiro, Brown, & McKay, 2009), increase harm-avoidance (Tetsuya et al., 2005), increase hope (Snyder, Rand, & Sigmon, 2002), increase resilience (Masten, 2001) and increase spirituality (meaning and peace, and faith) (Carmody, Reed, Kristeller, & Merriam, 2008). Studies of mindfulness

in the business context have shown that increases in mindfulness are associated with increased creativity and decreased burnout (e.g., Langer, Heffernan, & Kiester, 1988).

Emotion regulation

Although mindfulness training does not explicitly instruct changing the nature of thinking, or emotional reactivity, mindfulness skills influence emotion regulation by developing one's ability to de-center one's self from one's mental processes (to be discussed in Decentering sub-section). This *decentering* enables an ability to be less attached to negative thoughts via an increased capacity to release or let-go (e.g., Breslin et al., 2002; Craske & Hazlett-Stevens, 2002; Teasdale et al., 1995, 2002; Wells, 2002). Frewen et al. (2008) explain that this improved capacity of letting-go of negative thoughts, thus may allow negative thoughts to be more controllable and less intrusive and bothersome. Such abilities may improve affective experience via improved regulatory control over affective mental content (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010). This brings one of the central concepts of mindfulness training to the fore, that emotion is not the "problem" to be dealt with, but rather the pervasiveness and strength of the cognitive reactions to the emotions is the "problem" to be dealt with.

The result of a behavioural study by Ortner, Kilner, and Zelazo (2007) supports this understanding of the mechanisms at play. The study found that mindfulness skills allowed for decreased emotional reactivity to affective images. This finding is consistent with mindfulness training-related decreases in neural activity elicited by affective distractors within the amygdala and other brain regions involved in emotional processing (Brefczynski-Lewis et al., 2007; see also Farb et al., 2007). Decreased emotional

reactivity might in turn increase individuals' capacity for cognitive flexibility, freeing the individual to direct his or her attention toward more adaptive lines of thought, problem solving, and courses of action. Lykins and Baer (2009) espouse that a reduction in the fear of emotion, increases the ability to engage in goal-oriented behaviour when upset. Another study by Bishop et al. (2004) suggests that higher mindfulness scores are associated with reductions in emotional distress through improved affect tolerance and reduced rumination. It may be that the ability to reduce mental preoccupation with day-to-day stressors may be a contributing mechanism through which mindfulness affects symptom change and well-being, and the person may more deeply experience a sense of spiritual well-being (Carmody et al., 2008).

Recent functional neuroimaging studies have provided further clarity as to the ways in which mindfulness enhances emotion regulation. Findings by Farb et al. (2007) show evidence that MBSR reduces a subject's tendency to focus on their narrative and conceptual experience, while increasing the experiential and sensory self-focus at post-MBSR (Farb et al., 2007) and decreased conceptual–linguistic self-referential processing from pre- to post-MBSR (Goldin, Ramel, & Gross, 2009). Mindfulness skills have been shown to reduce the habitual tendency to emotionally react to and ruminate about transitory thoughts and physical sensations (Jain et al., 2007; Lykins & Baer, 2009; Shapiro, Brown, & Biegel, 2007; Teasdale et al., 2000), modify distorted patterns of self-view (Goldin et al., 2009), enhance behavioural self regulation (Lykins & Baer, 2009), and improve volitional orienting of attention (Jha, Krompinger, & Baime, 2007). Mindfulness may also operate indirectly through the enhancement of self regulated

functioning that comes with ongoing attentional sensitivity to psychological, somatic, and environmental cues (Baumeister, Heatherton, & Tice, 1994; Carver & Scheier, 1998; Deci & Ryan, 1995).

fMRI research examining the neural substrates of emotional reactivity and repair has validated and extended the above mentioned self-report, correlational research. Creswell, Way, Eisenberger, and Lieberman (2007) examined reactivity to threatening emotional visual stimuli, as measured by amygdala activation, and the prefrontal cortical mechanisms by which people regulate their threat responses through stimulus labelling. The study found that higher Mindful Attention Awareness Scale (MAAS) scorers were less reactive to threatening emotional stimuli, as indicated by a mitigated bilateral amygdale response and greater prefrontal cortical activation while labelling those stimuli. The same study found that more mindful people may have greater affect regulation ability, indicated by enhanced prefrontal cortical inhibition of amygdala responses. Oschner, Bunge, Gross and Gabrieli (2002) have suggested that this pattern of activity may be associated with "turning down" or evaluation processes, thus switching from an emotional to an unemotional mode of stimulus analysis. These differences in neural connectivity between those with and without meditation experience represent a key distinction between mindfulness training and maladaptive emotion regulation. Corcoran et al. (2010) propose that these changes are enabled because rather than labelling the emotion as something negative to be controlled and ruminated upon or suppressed, the momentary assessment of emotion is performed with greater precision and attention to nuanced changes. Ultimately, Corcoran et al. further explain that a more

sophisticated processing of emotion can occur, and with it the possibility for variability in an otherwise categorically negative emotional experience. Such an experience makes the possibility of emotional oscillation, of an ebb and flow to positive and negative emotions a more realistic possibility.

Increased positive affect

A recent study by Killingsworth and Gilbert (2010) sought to better understand the relationship between mindfulness and happiness. The researchers developed an iPhone web application to track 2,250 participants' behaviour. At random intervals participants were asked how happy they were, what they were currently doing, and whether they were thinking about their current activity or about something else that was pleasant, neutral, or unpleasant. Findings revealed that people were happiest when making love, exercising, or engaging in conversation; and least happy when resting, working, or using a home computer. More interestingly however, the researchers estimated that only 4.6 percent of a person's happiness in a given moment was attributable to the specific activity he or she was doing, whereas a person's mind-wandering status accounted for about 10.8 percent of his or her happiness. Time-lag analyses suggested that the subjects' mind-wandering was generally the cause, not the consequence, of their unhappiness. According to Killingsworth, "Mind-wandering is an excellent predictor of people's happiness. In fact, how often our minds leave the present and where they tend to go is a better predictor of our happiness than the activities in which we are engaged."

An earlier study by Davidson showed that patients suffering from depression and anxiety have increased EEG power in the right part of the brain when resting, while psychologically healthy subjects have greater activity on the left (Henriques & Davidson, 1991). The left side of the brain is associated with positive emotions and greater dispositional positive affect. A 2003 study by Davidson and colleagues measured resting EEG patterns in healthy subjects before and after an MBSR intervention, as compared to a control group. Although the study was small, it showed that after eight weeks of MBSR training, the resting EEG patterns indicated a leftward shift in brain activity, and that this shift persisted for three months after completion of the study. Interestingly, these results correlated with improved immune function. In another study, Kabat-Zinn (2003b) found MBSR participants to have significantly increased left-sided activation in the anterior portions of their cortical brain areas.

Stress reduction

A large-scale and promising study by Jha et al. (2010) investigated the impact of mindfulness training (MT) on working memory capacity (WMC) and affective experience. Working memory is a cognitive system closely related to attention (see Jha, 2002; Redick & Engle, 2006). WMC is the capacity to selectively maintain and manipulate goal-relevant information without getting distracted by irrelevant information over short intervals. It is used in managing cognitive demands and regulating emotions, and can be depleted during high-stress intervals. Pre-deployment military recruits were used for the study. Findings revealed that in the MT group, WMC decreased over time in those with low MT practice time, but increased in those with high

practice time. Higher MT practice time also corresponded to lower levels of negative affect and higher levels of positive affect. The relationship between practice time and negative, but not positive, affect was mediated by WMC, indicating that MT-related improvements in WMC may support some but not all of MT's salutary effects. Even so, these encouraging findings suggest that sufficient MT practice may protect against functional impairments associated with high-stress contexts.

A study by Tang and colleagues (2007) further shed light on the ways in which mindfulness may reduce stress levels. The study examined the effects of meditation on the hypothalamic-pituitary-adrenal (HPA) axis, a major signalling pathway for stress. It found meditation reduces stress-related activity of the HPA axis. It is thought that hyperactivity of the HPA axis may play a causal role in the development of mood and anxiety disorders (e.g., Holsboer, 2000).

Attention

Attention plays a crucial role in a range of experiences that directly affect psychological health and well being, such as emotion regulation, stress management and anxiety and depression. Biofeedback research has long shown that attention can play a key component in reducing unhealthy somatic conditions or symptoms of illness (e.g., Basmajian, 1989). This research shows that the process of disregulation takes effect when distress signals are ignored or masked, rather than using the information to make appropriate adjustments.

Behavioral results suggest that mindfulness training (MT) improves attentional orienting and conflict monitoring (Chan & Woollacott, 2007; Heeren, Van Broeck, &

Philippot, 2009; Jha, Krompinger, & Baime, 2007; Tang et al., 2007; Wenk-Sormaz, 2005) and reduces the attentional blink, which is the ability to detect visual stimuli presented in rapid succession (Slagter et al., 2007). Changes in attention-sensitive neuroelectric components and oscillatory profiles have also been reported with MT (Cahn & Polich, 2009; Lutz et al., 2009). Interestingly, both increases in cortical thickness within attention-related sub-regions of prefrontal cortex (PFC; Lazar et al., 2005) and "more efficient" functional activity profiles within these sub-regions during attention-demanding tasks (Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007) correspond to lifetime hours of MT practice. Thus, not only do subjective, behavioral, and neural results suggest that MT improves specific attentional components of cognitive control, but the magnitude of these improvements appears to have a "dose-response" relationship with the amount of time spent engaging in MT practice (Treadway & Lazar, 2010), more practice time leads to greater improvements.

Schultz and Heimberg (2008) published a study focusing on the use of attentional control in the treatment of Social Anxiety Disorder (SAD), a condition whereby patients typically show attentional avoidance of threat stimuli. A reduction in SAD symptoms with increased neural response in visual attention-related brain regions suggested that MBSR-related changes in attention processes may modify habitual reactivity in the context of negative self-beliefs, helping to attenuate avoidance and increase attentional allocation. The ability to implement attentional deployment, a specific emotion regulation strategy, allows for a redirection of attention to thoughts, emotions, and

physical sensations, a key feature of MBSR. This may be an important skill for adults with SAD to develop because it may enhance the efficacy of exposure therapy for SAD.

Also related to understanding of the role of mindfulness and improved attention, Langer (1997) applied mindfulness techniques with a view to improve attentional processes in an educational environment. Langer asked both students and teachers what they meant by *paying attention*. Interestingly, both groups believed that this meant to "hold the image still as if focusing a camera." Langer points out, that if one follows this instruction; it is very difficult to stay attentive. Instead, this researcher found that if people are instructed to vary the stimulus, that is, to mindfully notice new things about it, then attention improves. Furthermore, Langer points out that such mindful attention also results in a greater liking for the task and improved memory.

Neuroscientific evidence

A growing body of literature points to the evidence of mindfulness-based neuroplasticity. The findings below are based on research using meditators, as some studies show that meditation enhances mindfulness. Two studies have independently demonstrated that individuals who regularly practice meditation, appear to be protected from the normal patterns of reduced gray matter volume and cortical thinning, particularly in the anterior insula and sensory cortex-regions involved in observing internal and external physical sensations (Lazar et al., 2005; Pagnoni & Cekic, 2007). These areas are associated with attention and sensory processing. This protection is of particular relevance as decreased volume in the anterior insula has been strongly implicated in several psychopathologies including post traumatic stress disorder (PTSD),

social anxiety, specific phobias and schizophrenia (Etkin & Wager, 2007; Crespo-Facorro et al., 2000; Phillips, Drevets, Rauch, & Lane, 2003; Wright, Rabe-Hesketh, Mellers, & Bullmore, 2000).

Another study (Lutz, Brefczynski-Lewis et al., 2008) found that meditation increased activation in the interior insula. The study examined the differences in Tibetan monks and novice meditators in response to aversive sounds during meditation. The monks, as compared to the novice meditators, exhibited increased activation in the interior insula, when hearing aversive, as opposed to positive emotional sounds. The localization to the insula is consistent with known activation of this region by negative emotional stimuli (e.g. Phillips et al., 2003) in addition to other reports, suggesting that this region is altered through meditation experience (Lazar et al., 2005; Holzel et al., 2008). The data implies that the structural changes associated with practice may underlie the improved emotional regulation demonstrated by the monks (Treadway & Lazar, 2010). These results suggest that mindfulness may promote equanimity in the face of emotionally challenging events, as reflected in a greater willingness to tolerate or remain experimentally present to unpleasant stimuli without cognitive reactivity (Eifert & Heffer, 2003; Levitt, Brown, Orsillo, & Barlow, 2004).

Another study established that regions of the dorsolateral prefrontal cortex, a part of the brain associated with decision-making, attention and cognitive processing, are larger in meditators (Baerentsen, Hartvig, Stodkild-Jorgensen, & Mammen, 2001). These findings were corroborated by Frewen et al. (2010) who found that mindful "observing" positively predicted fMRI-BOLD response within the dorsomedial

prefrontal cortex (DMPFC) and left amygdala. A further study by Lazar and colleagues (2005) found that hours of meditation practice ranging from novice to expert positively predicted grey matter volume in the right anterior insula and prefrontal cortex, areas involved in interoceptive awareness and viscerosomatic representation (Craig, 2004).

Holzel et al. (2010) examined the neurological effects of MBSR in healthy but stressed individuals, new to meditation. The findings indicated changes in the hippocampus and inferior temporal lobe after just eight weeks of practice. Furthermore, the amygdale shrank in individuals who reported feeling less stressed, consistent with animal studies, showing correlations between the size of the amygdala and stress behaviours (Holzel et al., 2010). The amygdala is associated with both mindfulness and depression. This relationship between elevated resting amygdala and depressive symptomology suggests that one mechanism by which mindfulness training may reduce depression relapse and symptoms is by quelling heightened resting amygdale activity to below the threshold for triggering depression and relapse or depressed mood (Way, Creswell, Eisenberger, & Lieberman, 2010).

Two different studies suggest that meditation also appears to increase gray matter in the medulla oblongata in the brain stem- the part of the brain responsible for basic functioning, such as breathing and heart rate (Vestergaard-Poulsen et al., 2009; Holzel et al., 2010). While these findings are preliminary, increased gray matter in these regions may suggest increased enervation from cortical centres, which might result in greater top-down control over largely automatic processes (Treadway & Lazar, 2010). If the findings are indeed true, this would be consistent with self-reports of decreased arousal

when reacting to aversive situations. Increased density in the brain stem region may also reflect enhanced projections from the brain stem to higher cortical regions involved in interoceptive awareness, for example the insula (Treadway & Lazar, 2010).

The neural correlates of mindfulness lie less in the ability to eliminate emotional processing and more in strengthening the neural link between such processing with higher cognitive function like self reference, memory retrieval, and verbal elaboration (Corcoran, Farb, Anderson, & Segal, 2010). Heightened neural representation of emotion has also been found in a study with experienced meditators (> 4 years of regular practice): Lazar et al. (2000) found widespread cortical deactivation during meditation but widespread activation in the limbic cortices and hippocampus.

Relationship and social interaction quality

Several researchers have begun to explore the understudied relationship between mindfulness and social interactions. Not surprisingly, this preliminary research suggests that the qualities inherent in mindfulness, that of attentiveness, compassion, and non judgmental-ness bode well in the context of interpersonal dynamics. Kabat-Zinn (1993c) and Welwood (1996) argued that mindfulness promotes attunement, connection, and closeness in relationships. Several studies by Brown and colleagues echoed this sentiment, finding that MAAS-assessed mindfulness was positively related to, or predictive of a felt sense of relatedness and interpersonal closeness (Brown & Kasser, 2005; Brown & Ryan, 2003; 2004). Specifically, the receptive attentiveness that characterizes mindfulness may promote a greater ability or willingness to take interest in a partner's thoughts, emotions and welfare; it may also enhance the ability to attend to

the content of a partner's communication while also being aware of the partner's (sometimes subtle) affective tone and nonverbal behaviour (Goleman, 2006). At the same time a person may be more aware of their own cognitive, emotional, and verbal responses to the communication (Brown et al., 2007) facilitating an ability to witness thought and emotion so as not to react impulsively and destructively to them (Boorstein, 1996). Barnes et al. (2007) found that higher MAAS measured trait mindfulness, predicted higher relationship satisfaction and greater capacities to respond constructively to relationship stress among non-distressed dating couples.

Physical health

A meta-analysis of mindfulness-based stress-reduction programs established that this type of intervention is efficacious for individuals coping with a variety of physical conditions including pain and heart disease (Grossman, Niemann, & Stefan, 2004). Further controlled MBSR studies have shown efficacy in reducing medical symptoms and increasing health-related quality of life in healthy, but stressed populations (Monti et al., 2005) and cancer populations (e.g., Carlson, Speca, Patel & Goodey, 2003). In another study, Davidson et al. (2003) examined the effects of MBSR on the immune system response to an influenza vaccine in a sample of stressed biotechnology workers. Findings showed that compared to control participants, MBSR participants had greater antibody titers responses at follow-up, suggesting enhanced immune responsiveness. Another such study by Massion et al. (2005) used a non-clinical sample of women meditators, trained in MBSR, and established that meditators, as compared to a control

group, had increased levels of melatonin in their urine, indicating increased immune function and decreased levels of stress.

Consistent with previous research, Takahashi et al. (2005) found that Zen mindfulness meditation and mindful breathing results in an increase in slower alpha wave power (also see Tassi & Muzet, 2001; Young & Taylor, 1998), which is associated with reduced activity of the sympathetic nervous system (Delmonte, 1985; Walton et al., 1995; Young & Taylor, 1998) and increased parasympathetic activity (Kubota et al., 2001). Furthermore, synchronization of slow alpha waves in the frontal cortex was also found. This synchronization indicates increased endogenous release of dopamine and shows participants had shifted from externally focused attention that involves "non-task related cognitive processes such as expectancy and attention" to internally focused attention that reflect task-related processes (Takahashi, p. 204; Kjaer et al., 2002). It is this change in attentional focus that is believed to inhibit sympathetic nervous system activity (Takahashi et al., 2005). Interestingly, this sequence of events has been associated with the degree of harm avoidance (Takahashi et al, 2005). Harm avoidance corresponds to an inhibitory response to signals of aversive stimuli that leads to avoidance of punishment and non-reward, and is theoretically associated with serotonergic activity (Cloninger, 1987; Herbst et al., 2000; Peirson et al., 1999).

Mindfulness treatments have changed the face of pain management. Common sense would suggest that attending to discomfort would exacerbate the condition, though more consistent with mindfulness theory, several pain management researchers have explored the conditions under which attention to somatic states can serve the short-term

goal of alleviating physical discomfort while reaping the regulatory benefits that such attention can provide (Brown et al., 2007). These findings and others like it have fundamentally changed long-standing views on the subject of pain management, which historically recommended the benefits of distraction and other attentional diversion strategies in coping with physical pain.

Mindfulness-Based Interventions

Mindfulness was introduced to secular clinical settings through the pioneering work of Kabat-Zinn (1982, 1990). Kabat-Zinn developed Mindfulness-Based Stress Reduction (MBSR) in an effort to treat medical patients who had failed to respond to conventional medical treatments. MBSR is an eight-week group program that cultivates mindfulness through the intensive practice of a variety of mindfulness-based exercises. The medical and psychological literatures have published findings related to MBSR heavily over the past 25 years. Another mindfulness based treatment, Dialectical Behavioural Training (DBT) was developed by Linehan (1993) for the treatment of borderline personality disorder. The treatment nurtures increased affect tolerance and has been particularly effective in reducing self-mutilating and suicidal behaviours. Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002) utilizes a combination of mindfulness meditation and cognitive therapy, and has been adept at reducing depressive relapses (e.g. Teasdale et al., 2002). Another clinical orientation that rests heavily on mindfulness principles is Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999). This approach focuses on modifying

the impact of thoughts (i.e. the recognition and labelling of cognitions) in order to enhance the capacity for behavioural change.

Each of the above mentioned treatments are manualized and supported by a dense and growing body of efficacy evidence, as reported in numerous reviews (e.g. Bishop, 2002; Blennerhasset, O'Raghallaigh & Wilson, 2005; Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hayes, Masuda, Bisset, Luoma & Guerrero, 2004; Williams, Duggan, Crane, & Fennell, 2006). Therapies that emphasize acceptance as well as change have been called the "third wave" of cognitive-behavioral psychotherapies (Hayes, 2004; Hayes, Follette, & Linehan, 2004). Some researchers are heralding mindfulness-based interventions as the third major turning point in the development of structured therapies (e.g. Hayes, 2004; Williams & Swales, 2004).

Understanding the principles of "third wave" clinical interventions

Many schools of psychotherapy highlight the importance of observant, awareness and attention. For example, psychoanalytic *free association* represents a receptive awareness wherein attention "evenly hovers" over the psychological landscape (Freud, 1912). Gestalt theory emphasizes the importance of the here and now (Perls, 1973) and self determination theory strongly promotes open awareness as being valuable to one's ability to choose behaviours that are consistent with one's needs, values and interests (Ryan & Deci, 2000). However, the distinction between these and mindfulness-based interventions is quite pronounced. Specifically, mindfulness is not considered to be a therapeutic intervention that that can be *applied* to the individual (Kabat-Zinn, Lipworth, & Burney, 1985). Rather, mindfulness is a process that is taught, and that ideally

becomes an aspect of lifelong practice - a process that remains within the power of the individual to initiate and/or utilize (Kostanski & Hassed, 2008). Another, more fundamental difference is that mindfulness interventions promote changing one's relationship to thoughts and feelings, rather than changing the content of the thoughts and feelings per se. Therefore, while the fundamental philosophy of mindfulness-based interventions is to evoke clarity through observation rather than change per se, the practice nonetheless facilitates adaptation, through enabling people to see more clearly and approach whatever arises with kindness and acceptance.

"Third wave" therapeutic orientations' use of non-judgment or accepting attitude facilitates the developing capacity to sustain attention to current experience, especially when it is cognitively or emotionally challenging (Brown et al., 2007). This approach is particularly effective in that it allows for contact with phenomena that are typically hidden from conscious awareness because they represent threats to the self-concept or to aspects of the self that are ego-invested. The intention of mindfulness-based interventions is to establish psychological distance between the emotion and the individual, thereby limiting its behavioural consequences (Kabat-Zinn, Lipworth, & Burney, 1985) and diminishing impulsive or defensive reactions to unsettling experiences (Ryan, 2005). The act of watching one's experience with equanimity rather than attempting to alter or control one's experience is central to mindfulness training (Brown & Ryan, 2003; Creswell, Way, Eisenberger, & Lieberman, 2007). Heightened awareness can provide increased insight into how automatic, habitual patterns of over-identification and cognitive reactivity to sensations, thoughts, and emotions increase

stress and emotional distress. A technique used in mindfulness training is the labelling of thoughts, feelings, and stimulus. Labelling is thought to reduce identification with the literal content and create an attentional buffer between the stimulus and the response.

Initial concerns regarding potential clients' receptivity to mindfulness training considered that they might find it an esoteric or foreign practice perhaps too closely identified with meditation per se (Dimidjian & Linehan, 2003). However, accumulating evidence suggests that client interest in mindfulness is high, with 85% of participants, averaged across studies, completing the mindfulness-based treatment programs (Baer, 2003).

Carmody (2009) warns it is prudent to remember that mindfulness is only one arm in that system which is oriented toward the reduction of suffering, and suggests that while researchers debate the operational definition of mindfulness (e.g. Carmody et al., 2008; Grossman, 2008), a more immediate clinical priority may be to delineate the qualities of attending to experience that lead to well-being as reported by participants in mindfulness training and find the most accessible ways of cultivating those qualities, while at the same time keeping in view the possibility of more penetrating investigation into the underlying processes of consciousness.

Meditation and contemplative practices

Buddhist scholars have long recognized a diversity of methods by which mindfulness can be cultivated and practiced, but have made a clear distinction between these methods and the meaning of mindfulness itself (Brown et al., 2007). Meditation is

one such tool or practice used to deepen mindfulness. There are an abundance of meditation styles and techniques, each poised to address different intentions.

The bulk of research has drawn upon mindfulness-based meditation, as the primary intention of the practice is to increase mindfulness. Mindful and insight practices, such as mindfulness meditation and vipassana meditation, focus on conscious moment-to-moment attention, enabled through heightening bare attention to a range of foci including the breath, sensory experience, thoughts, feelings and bodily sensations, with a stance of accepting whatever arises. A practitioner of mindfulness meditation is receptive to all stimulations that may arise. The greater sense of autonomy arising from mindfulness practice comes not so much from a need to control thoughts, sensations and emotions, but rather from the experience of not having to be controlled by them (Kostanski & Hassed, 2008). Concentrative practices however (e.g., transcendental meditation, loving kindness meditation and Eight Point Program) focus attention on a single point of awareness such as a single word or phrase, a candle flame, or even one's own breathing. Transcendental meditation aims to transcend both the object and the process of experience, leaving the experience or subject alone-the experience of transcendental consciousness (Maharishi, 1994). The research has also indicated that the electroencephalogram patterns of meditators who utilize different forms of meditation vary from each other, with mindfulness meditation producing more delta, theta, alpha, and beta activity (Dunn, Hartigan, & Mikulas, 1999; Valentine & Sweet, 1999).

Centering prayer is another form of mindfulness practice that grows out of the Christian tradition and was developed in the 1970's. Though it has received much less

published attention, Robbins (2002) suggests that contemplative traditions based in other religions, such as Centering prayer should be introduced to clients who object to the Buddhist roots of mindfulness. According to Keating (1999) centering prayer involves "choosing a sacred word as the symbol of your intention to consent to God's presence and action within" (p.139). Blanton (2011) explains that the practice suggests redirecting attention away from thoughts, focusing on the "intention to be open to God" (p. 136).

How aspects of meditation practice affect mindfulness

Researchers are beginning to address practical and timely questions relating to over-arching themes pertaining to mindfulness-based clinical treatments. For example, Carmody and Baer (2009) raised the issue of the length of mindfulness-based interventions. Meta-analyses found no significant relationship between time in the weekly MBSR classes and effect size of outcomes, suggesting that shorter mindfulness-based courses were equally as effective as longer ones. That is, psychological symptoms may respond similarly to six hours or twenty-eight hours of MBSR class-time. It is not yet established however; whether outcomes other than psychological distress, for example brain and immune function would benefit from longer in-class hours (see Davidson et al., 2003).

One explanation for this deficit stems from the fact that many studies examine MBCT training, a structured 8-session group intervention. Of the few studies that have examined frequency of practice beyond standardized treatments, some have found associations between the amount of practice and treatment outcome, while others have not (Carmody & Baer, 2008; Greene, 2004). Again, this could be due to the fact that

most studies examine frequency of practice during the MBCT treatment period (Ramel et al., 2004; Speca et al., 2000) with only a few reporting data beyond the program's end.

Of the studies that consider frequency of meditation in an unstructured meditation practice, most (ex. Britton et al., 2010; Bondolfi, Jermann, Van der Linden, Gex-Fabry, & Bizzini, 2010) consider "regular" meditation to be one practice per week. Another study (Greene, 2004) examined the effect of recent versus lifetime meditation experience and found that that recent meditation was associated with emotional health, vitality, and stress reactivity, whereas lifetime meditation experience was relatively unimportant. The same study found that the frequency of meditation versus the length of meditation sessions were of equal importance.

Shapiro (2009) suggests that these findings point to a larger umbrella question, namely, how can we best teach mindfulness? For example, what type of format (e.g., individual or group) is best in terms of maximizing the learning of mindfulness? What size groups (small vs. large)? Heterogeneous versus homogenous participants? Number of meeting times per week? These questions and many others remain unanswered, and need to be explored empirically through rigorous and systematic research.

How Mindfulness Works: Mechanisms of Mindfulness

Despite the seemingly convincing evidence that mindfulness-based interventions evoke strong clinical benefits, the specific mechanisms, including the mediating and moderatoring effects by which mindfulness leads to these benefits remain unclear (Shapiro, Carlson, Astin, & Freedman, 2006). Several theorists have proposed models

offering explanations for the mechanisms underlying mindfulness interventions, a few of which will be outlined below.

Decentering as a metamechanism

Decentering is generally accepted by all mindfulness theories to be the essential ingredient that promotes change in mindfulness-based treatment. In fact, published definitions of *decentering* are very similar to definitions of mindfulness, and the empirical evidence suggests that the distinction between the two requires further clarification (Carmody, Baer, Lykins, & Olendzki, 2009; Sauer & Baer, 2010). Bishop et al. (2004) describe *decentering* and mindfulness as falling within a "general domain of constructs that describe the ability to observe the temporal stream of thoughts and feelings." Despite the overlap, the two variables are currently considered to be independent (e.g. Fresco, 2007; Shapiro, 2006).

Decentering describes a fundamental shift in perspective allowing a person to take a detached or objective stance on one's thoughts and emotions (Fresco et al., 2007; Shapiro et al., 2006). This shift allows for thoughts and feelings to be experienced as temporary, objective events in the mind, as opposed to reflections of the self that are necessarily true (Fresco et al., 2007). *Decentering* is the result of being mindful (Orzech, Shapiro, Brown, & McKay, 2009). The process of *decentering* is closely associated with Goleman's (1980) description relating to the process of meditation, "The first realization in 'meditation' is that the phenomena contemplated are distinct from the mind contemplating them." (p.146). *Decentering* implies a shift in conscious processing wherein individuals are able to step back from the drama of personal narrative or life

story, and witness it. The metacognitive insight that comes from this decentered perspective (e.g. Teasdale, Segal, & Williams, 1995) may have myriad psychological and behavioural consequences by, for example discouraging automatic, habitual thought patterns, including rumination and obsession (e.g. Teasdale, Moore, Hayhurst, Pope Williams, & Segal, 2002); thereby permitting and even encouraging a willingness to confront and accept threatening thoughts and emotions; and facilitate reality testing. An increased capacity to *decenter* is also associated with protection against depressive relapse (Ingram & Hollon, 1986; Teasdale et al., 2002; Farb, Mayberg, Bean, McKeon, & Segal, 2010) and low cognitive reactivity (Farb, Mayberg, Bean, McKeon, & Segal, 2010).

Decentering, a term introduced by Safran & Segal (1990) seems to be synonymous with *reperceiving*, a term originated by Shapiro, Carlson, Astin & Freedman (2006). Both terms are akin to the Western psychological concept of *deautomization* (Deikman, 1982; Safran & Segal, 1990), *distancing* and *defusion* (Carmody, Baer, Lykins, & Olendski, 2009). Metacognitive awareness is yet another term related to *decentering* and refers to "the process of experiencing negative thoughts and feelings within a decentered perspective" (Teasdale et al., 2002, p. 276). Both Beck et al. (1979) and Safran and Segal (1990) described it as an important element of change in cognitive therapy. Several cognitive theorists suggest that change results not from changing the content of depressive thinking, but is likely to be a product of the initial steps in the cognitive therapy process - identifying and observing thoughts in order to assess accuracy-the moment of *decentering*.

Kegan (1982) explained that developmental psychologists identified this shift in awareness to be instrumental in life span development. Thereby, if *decentering* is a metamechanism underlying mindfulness, then the practice of mindfulness is simply a continuation of the naturally occurring human developmental process whereby one gains an increasing capacity for objectivity about one's own internal process (Shapiro, 2009). Shapiro et al. (2006) therefore believe that mindfulness practice continues and accelerates an already existing developmental shift. The developmental process continues beyond the subject-object paradigm until the separate sense of self is seen through. Ultimately, one moves into an experience of simply knowing or perceiving: There is no one perceiving and nothing being perceived, but simply awareness happening (Shapiro, Carlson, Astin, & Freedman, 2006). It is important to clarify that *decentering* is not to be confused with detachment, distancing to the point of apathy or numbness. Instead, *decentering* engenders a deep sense of knowing or intimacy with whatever arises in the moment (Shapiro, 2009). It allows one to deeply experience each event of the mind and body without identifying with, or clinging to it, allowing for a "deep, penetrative non-conceptual seeing into the nature of mind and world" (Kabat-Zinn, 2003a, p. 146). A person experiences what *is* instead of a commentary or story about what is (Shapiro, 2009). Therefore, *decentering* contrasts detachment in that it manifests an experience of richness, texture and depth, moment-to-moment, which Peters (2004) refers to as "intimate detachment" (personal communication cited in Shapiro, 2009).

Another study revealed an unusual perspective on the *decentering* experience. Farb et al., (2010) used fMRI and the Experiences Questionnaire (EQ) to compare neural reactivity to sadness provocation in participants engaged in 8-weeks of mindfulness training. An unexpected finding was associated with CBT responders with low post-treatment *decentering* who seemed to have a more durable treatment response in association with high cognitive reactivity. One possible explanation for this finding is that low *decentering* may express a general inattention to one's thoughts and feelings and that it thus represents a proxy for distraction or perhaps an attentional control strategy that draws the mind away from self-focused attention (cf. Wells, 1990; Wells & Matthews, 1994).

A recent study by Feldman, Greeson, Senville (2010) set out to assess whether *decentering* is unique to *mindfulness* meditation or common across approaches. The researchers compared the immediate effects of mindful breathing to two alternative stress-management techniques: progressive muscle relaxation and loving-kindness meditation. As predicted, participants in the mindful breathing condition reported greater *decentering* relative to the other two conditions. The findings suggest that mindful breathing increases *decentering* and may help to reduce reactivity to repetitive thoughts. Ultimately, the study distinguishes mindfulness practice from other stress-management approaches.

Proposed models of mindfulness

Two theories, namely the Well's Self Regulatory Executive Function (S-REF) model (Myers & Wells, 2005; Wells, 1999) and Teasdale's Differentiation Activation

Hypothesis (DAH) have been put forth to address the primary mechanisms of mindfulness. The S-REF model and the DAH highlight the role of attention and metacognition in the development and maintenance of mental disorders. Both models emphasize the importance of self-directed attention, such as threat-monitoring, rumination and activation of dysfunctional beliefs in heightening anxiety. Well's suggests that an external attentional focusing, such as the one used in mindful training, rather than an internal one might help people with anxiety disorders.

The DAH outlines the tendency of transient negative mood states in evoking characteristic negative thought patterns, which can spiral and trigger a depressive relapse. Teasdale and colleagues proposed a theory suggesting that *decentering* can facilitate relating to negative thought patterns in a different way.

In 2006, Shapiro proposed the IAA model, which builds on the two previous attention models, the S-Ref and the DAH. This model is based on a definition by Kabat-Zinn, suggesting that mindfulness is the product of the simultaneous cultivation of three components a) a clear *intention* (I) as to why one is practicing, such as self regulation, self-exploration or self-liberation; b) an *attention* (A) characterized by the observation of one's moment-to-moment experience without interpretation, elaboration or analysis; and c) a quality of attending characterized by an *attitude* (A) of acceptance, kindness, compassion, openness, patience, non-striving, equanimity, curiosity and non-evaluation. Simply stated, the model proposes that mindfulness training develops the ability to dis-identify, or reperceive one's experience, which directly and indirectly mediates change (Shapiro, 2009). These researchers propose that *decentering* facilitates other

mechanisms, such as self regulation, values clarification and cognitive and emotional flexibility, which in turn lead to the reduction in symptoms and improved well-being. Shapiro (2009) suggests that this pathway is by no means to be considered linear; rather each mechanism affects and supports the others.

Self-compassion as a mechanism of change

Compassion, be it directed toward the self, or toward other, is considered to be a key mechanism of change in mindfulness and acceptance based treatments. Heightened compassion is a natural consequence of nonjudgmental awareness. While the topic of compassion is an important concept in Buddhist and Christian writings, Western psychology has recently tuned in to the potential offered by this human strength. Westerners tend to think of compassion as a feeling of caring, concern, or sympathy extended to others who are suffering (Baer, 2010). The same author explained that we admire people who are compassionate toward others and believe that kindness is an important character strength. Buddhist psychology, however, regards the self and others as interdependent and maintains that without compassion for the self, it isn't possible to extend compassion to others.

Empirical Explorations of Mindfulness

Brown and Ryan (2004) and Bishop et al. (2004) explain that operational definitions of mindfulness are essential for the development of valid instruments, which in turn are necessary for investigating the psychological processes involved in mindfulness training as well as understanding the components and the mechanisms by which mindfulness training exerts its beneficial effects. Despite the rapid growth in the

literature on mindfulness-based interventions, there has been a relative paucity of valid and reliable mindfulness measures (Bishop, 2002; Leigh et al., 2005). Furthermore, Bishop (2002) contends that the current research is fraught with methodological problems, including the use of unvalidated measures, improper use of statistics, and failure to control for potential confounds. As previously mentioned, the instruments set to measure mindfulness provide inconsistent definitions, with self-report scales ranging in complexity from one factor (Brown & Ryan, 2003; Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006) to five (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006).

While there is overlap between different definitions and operationalizations of "mindfulness", there are also numerous nontrivial differences. The various self-report measures purport to measure "mindfulness", but emphasize different aspects of the construct. Grossman's (2008) article "On Measuring Mindfulness in Psychosomatic and Psychological Research" outlines some of these inconsistencies. For example, the Five Facet Mindfulness Questionnaire (FFMQ) addresses the ability to verbally describe experience (e.g., "I'm good at findings the words to describe my feelings") and doesn't address curiosity, an aspect focused on by another measure, the Toronto Mindfulness Scale (TMS). Another instrument focuses on an agitated lack of attentiveness to daily life (e.g., "I rush through activities without being really attentive to them") and then reverse scores the items to assess mindfulness as the antithesis of inattentiveness. Some definitions emphasize intentionality, while others do not. These are some of the

pronounced differences between underlying definitions and the self-report scales set to measure "mindfulness".

Other shortcomings related to measuring mindfulness include the tendency to focus on the effects of mindfulness training, usually as part of a clinical treatment package, and less so on understanding the meaning and expression of mindfulness itself (Brown et al., 2007). The same authors highlighted two primary reasons as why this approach to understanding mindfulness can be problematic. First, it can spawn different definitions and operationalizations of the construct that accord with practitioner's relevant treatment perspective and with the outcome they seek to foster. Secondly, clinically oriented conceptualizations of mindfulness can confound the description of the phenomenon with methods through which it is fostered. Many studies report on symptom reduction and neglect to measure whether participants have become more mindful (Johnson, 2007).

A further shortcoming identified by Kabat-Zinn (1982) noted that most clinical studies are not equipped to establish which specific mechanisms in mindfulness-based treatments are effective, since the treatments are complex and multifaceted in nature, incorporating elements of various mindfulness-related techniques, such as breath awareness, body scans, and walking meditations, as well as physical exercise and stretching and training in cognitive reappraisal. Exploration of these individual components could be improved by measures that identify which treatment elements result in the observed changes.

Grossman (2008) documented a more general concern relating to existing mindfulness measures, noting the potential biases of inventory developers. The author explained that "many of the mindfulness measures have been written by researchers with a relatively modest level of personal experience with mindfulness meditation practices or Buddhist psychological theory and often with no clear contributions from traditional mindfulness meditation experts" (e.g., Refs. Baer et al., 2004 & 2006; Buchheld et al., 2002 being a notable exception). According to Grossman, the variations in the current operationalizations of the term often seem to correspond more closely to the researcher's own prior academic interests than to a deep understanding of Buddhist concepts.

Also, as researchers move toward a more fine-tuned understanding of mindfulness, it is necessary to discriminate between *outcomes* of practicing mindfulness from elements of the mindfulness construct. For example, Bishop et al. (2004) suggested that non-reactivity and compassion, although sometimes discussed as components of mindfulness, might be better understood as outcomes of mindfulness practice. Brown and Ryan (2004) made a similar point about acceptance.

Shortcomings of self-report measures

Self-report measures are the primary means used for measuring mindfulness as they are accessible, cost-effective and time-sensitive. However, these measures are vulnerable to numerous shortcomings resulting in some debate as to whether paper-and-pencil measures of mindfulness are feasible (Ryan, Kuhl, & Deci, 1997). For example, Matthews, Roberts, & Zeidner (2004) note that all self-report methods rely on the assumption that mindfulness can be accessed via declarative knowledge, meaning that

individuals can directly report on those experiential qualities that constitute mindfulness. But, what is now well-known, is that we can only know what people are meta-conscious of (what they believe they experience) not the actual contents of their subjective experience (e.g., Schooler & Schreiber, 2004; Wilson, 2002). Another shortcoming of mindfulness measures is that participant responses can be subject to demand characteristics or response biases, and mindfulness experiences are sometimes difficult to report on, especially for participants with no meditation experience.

Another consideration in the use of self-report mindfulness measures is the potentially significant discrepancies between how mindful individuals believe themselves to be (their self-ratings) vs. how mindful they really are (Grossman, 2008). The same author pointed out that an awareness of the value of mindfulness, i.e. those exposed to mindfulness-based interventions, are vulnerable to biasing and inflating their responses.

Findings suggest that the issue of semantics plays a significant role in the plight to measure mindfulness. Self-report measures tend to include language that overlaps with meditation instructions. Grossman (2008) explains that there are likely to be profound differences among respondents in the semantic understanding of scale items. This is hard to ovoid as both meditation instruction and the mindfulness measure are attempting to articulate the elusive construct mindfulness to individuals who sometimes have no prior exposure to the construct. Nonetheless, such overlap may artificially inflate the effects of mindfulness practice on self-reported *decentering* and mindfulness (Feldman, Greeson, & Senville, 2010). A study (Leigh, Bowen, & Marlatt, 2005) using

the Freiburg Mindfulness Inventory (FMI) reflects exactly this phenomenon. The study found that binge-drinking and smoking students had significantly higher mindfulness scores than a matched group of very experienced mindfulness meditators from another study immediately after an intensive multiday mindfulness retreat (Walach, Buchheld, Buttenmuller, Kleinknecht, & Schmidt, 2006). Grossman (2008) explains that a major contribution to the higher scores of the binging/smoking students was partially attributed to items related to somatic awareness, presumable due to frequent negative physical consequences of binge drinking or smoking behaviour. Grossman continues, "this issue of semantic inconsistency is, by no means, limited to items related to bodily awareness or to clinical groups, but resides in just how we define such terms as "awareness," "noticing," "paying attention," "judging," and "present moment." "

Grossman (2008) further points out that many mindfulness studies draw upon college students, who typically have little exposure to meditation, and therefore are likely to understand scale items differently than experienced meditators. A study by Buchheld, Grossman and Walach (2002) suggests that even among meditators, the extent of meditation experience may alter the meaning of words or items. The study found that within the same group of highly experienced meditators, from just before to just after retreats of 3 to 10 days, the factor structure of the FMI changed somewhat. These studies highlight the importance of selecting an appropriate population to validate a mindfulness instrument.

Alternatives to self-report measures

Recent studies are beginning to utilize objective measures such as functional fMRI's and other magnetic imaging to map the neurological changes that result from mindfulness training. Schooler (2004) states that the validity of self report measures would be enhanced if they were shown to converge with other probable - and preferably objective - indicators of subjective experience. Thus far the results from the objective measures have complimented findings attained by self-report measures. There is evidence that one self report measure, Mindful Attention Awareness Scale (MAAS) predicts neural activation in brain regions that are theoretically relevant to our understanding of mindfulness and its effects (Creswell et al., 2006; Creswell, Way et al., 2006). Indeed, both the subjective sense of attentional control and the likelihood of everyday cognitive failures correspond to individual differences in trait mindfulness (Baer, Smith, Hopkins, Krietmeyer, & Toney, 2006; Herndon, 2008). Behavioral performance and neural activity patterns on attention tasks using nonaffective stimuli, such as symbols, digits, and letters, corroborate these self-reported effects.

Another alternative to self report methods include laboratory-or computer-based tasks for which performance may reflect aspects of the tendency or ability to be mindful (Bishop et al., 2004). For example, mindfulness increases vigilance and attention switching. Another valuable assessment avenue relates to assessing semantic processing, in particular individuals' ability to perform on tasks that require inhibition of semantic processing, such as the emotional Stroop task, with the expectation being that more mindful individuals would perform better (Williams, Matthews, & MacLeod, 1996).

Grossman (2008) recommends that mindfulness research could benefit from pursuing a qualitative assessment, based on interview data, of differences between mindfulness practitioners and non-practitioners, or in relationship to parameters of mindfulness training (e.g., extent and type). Grossman further suggests an additional method of measuring mindfulness is to examine the outcomes of mindfulness practice closely, such as the enhancement of well-being of a person undergoing mindfulness training (e.g., Ref. Grossman, Niemann, Schmidt, & Walach, 2004) or of positive effects on others (e.g., Singh, Lancioni, Winton, Wahler, Singh, & Sage, 2004).

Similar to Killingsworth and Gilbert's (2010) study which used an iPhone application to track participants' behaviour, Brown and Ryan (2003) used a somewhat novel method of experience sampling to assess state-mindfulness. Participants carried pagers for several weeks, and were paged at quasi-random intervals during the day. When beeped, they immediately answered a subset of MAAS items, asking about attendance to their current activity. Results showed that momentary-state mindfulness was significantly correlated with baseline levels of trait-mindfulness, as assessed by the original MAAS. Interestingly, higher levels of state-mindfulness also correlated with higher levels of positive emotions, autonomy, and lower levels of negative emotions while engaged in the activity of the moment.

Overview of current self-report mindfulness measures

More than a half dozen self-report mindfulness questionnaires have been published. While most researchers have reviewed the instruments to be psychometrically sound, showing good internal consistency and expected correlations

with several other variables (e.g. Baer et al., 2006), Brown et al. (2007) suggest that most, if not all current mindfulness instruments, suffer from a paucity of construct and predictive validation. Grossman (2008) explained that the individual hybrid concepts underlying the measurement of mindfulness differ so much so that different scales are often uncorrelated with each other or correlated very modestly (e.g. Carmody, 2008; Refs Baer et al., 2004; Thompson & Waltz, 2007).

Interestingly, most measures were designed to assess mindfulness as a trait-like quality, which is a general tendency to be mindful in daily life. Alternatively, mindfulness can be viewed as a mode, or state-like quality, that is maintained only when attention to experience is intentionally cultivated with an open, nonjudgmental orientation to experience (Bishop et al., 2004). Some researchers study state-mindfulness, through a brief laboratory-based experimental induction of a mindful state, while directing participants to pay more focused attention to their moment-to-moment physical, emotional and cognitive experiences.

Another aspect of measuring mindfulness that deserves attention relates to whether the construct should be measured in a unidimensional or multidimensional manner. The general consensus among theorists (e.g. Sauer & Baer, 2010) is that a facet-based conceptualization of mindfulness may be particularly useful clinically. The ability to assess the elements of mindfulness separately may aid in tailoring mindfulness training to individuals with particular strengths and weaknesses (Sauer & Baer, 2010). Furthermore, empirically based information about the facets may provide further clarity as clinicians describe mindfulness to clients. Brown et al. (2007) explains that most

mindfulness scales measure at least four distinct, but interrelated, constructs. The researchers propose that if facet scores can be entered separately into regression analyses, then facets significantly related to the dependent variable will be included in the equation, whereas nonpredictive facets will be dropped, and the incremental validity of some facets over others in predicting the dependent variable can be examined. This reasoning suggests that the most useful measures of mindfulness will be those that measure all relevant facets separately and reliably.

This study employs the Five Facet Mindfulness Questionnaire (FFMQ), the Toronto Mindfulness Scale (TMS) and the Experiences Questionnaire (EQ) to measure mindfulness. These instruments, and the reason for using each, will be addressed in chapter II. There are however three other frequently used mindfulness instruments that deserve mention. Firstly, The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003) which has a unidimensional factor structure. Secondly, The Freiburg Mindfulness Inventory (FMI; Buchheld, Grossman, & Walach, 2001) which was developed with participants in mindfulness meditation retreats and is primarily designed for use with individuals who have meditating experience. And lastly, The Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004) which is a 39-item self-report instrument that assesses mindfulness as conceptualized in DBT.

Other self-report mindfulness measures that are not used as frequently include The Cognitive and Affective Mindfulness Scale (CAMS; Feldman, Hayes, Kumar, & Greeson, 2004), the Revised Cognitive and Affective Mindfulness Scale (CAMS-R; Feldman, Hayes, Kumar, Kamholz, Greeson, & Laurenceau, 2005), the Mindfulness

Questionnaire (MQ; Chadwick, Hember, Mead, Lilley, & Dagnan, 2005) and the Philadelphia Mindfulness Scale (PHLMS; Cardaciotto, Herbert, Forman, Moitra, & Farrow (2008).

Findings from studies measuring change in meditators

In an interesting study focused on better understanding the facets of mindfulness, as measured by the KIMS, Tanner et al., (2009) examined the effects of a transcendental meditation program on mindfulness. The study was particularly interesting as it reflected on similar research performed by Baer et al. (2004) which found the sub-scale measuring the skill of observing one's internal experience (Observe) was negatively correlated with accepting without- judgment in a general sample (Baer et al., 2004) and failed to load on a second-order mindfulness factor (Baer et al., 2006). This finding reversed when a subset of participants with meditation experience were examined separately (Baer et al., 2006). Such a finding suggests that observing one's thoughts and feelings is somewhat incompatible with nonjudgmental acceptance of them in unselected samples, but that these two aspects of mindfulness are linked among meditators. Tanner et al. (2009) explain that this pattern could express a phenomenon whereby meditation practice disrupts an otherwise typical association between observation and judgment of thoughts and feelings. Another reason could be a self-selection effect such that people for whom observation of internal experience is associated with nonjudgmental acceptance are more likely to be interested in taking up meditation. Tanner et al. (2009) believe their findings favour the self-selection interpretation. The researchers explain that nonsignificant differences between transcendental meditation and waitlist conditions, and between

pretest and posttest measures in sub-scale intercorrelations, provided them with no basis to conclude that meditation changes the associations of mindfulness facets. Conversely, they explained that finding a significant pretreatment positive correlation between Observe and Accept-Without-Judgment mindfulness sub-scales suggests that this positive association is characteristic of those interested in learning to meditate, as opposed to being a result of instruction and practice of meditation. That is, it may be that people for whom Observe and Accept-Without-Judgment skills tend to go together may be the ones drawn to meditation in the first place as an enjoyable practice (Tanner et al. 2009).

Cross Cultural Considerations

Few studies have examined the cross-cultural equivalents of mindfulness instruments. One such study by Christopher, Charoensuk, Gilbert, Neary, and Pearce (2009) used the KIMS and MAAS (Brown & Ryan, 2003) to assess the applicability of these Western conceptualizations of mindfulness within a Thai Buddhist context. Results from the KIMS, suggest that the Thai students have ‘‘a much more fluid conceptualization of mindfulness’’ and do not make such clear distinctions between its various elements (e.g., Observing, Describing, Acting with Awareness, and Accepting without Judgment) as do Americans trained in mindfulness. Results from the MAAS, which focuses on the attentional component of mindfulness, indicate that Thai and Western students had a similar understanding of this aspect of mindfulness. However, the authors highlight that although the MAAS may fit better across cultures, its one-

dimensional definition may not adequately capture the multilayered richness of mindfulness.

The Current Study: Research Questions and Hypotheses

Research question I:

How do the three self-report measures compare to one another (full scales)? Furthermore, how do the sub-scales of the three measures relate? More specifically, how do the sub-scales that intend to measure the same facet of mindfulness compare (TMS Decentering and EQ Decentering) and the sub-scales that intend to measure different facets of mindfulness compare (e.g., FFMQ Observe and EQ Curiosity).

Hypotheses:

1. There will there be significant and modest to high correlations between all the respective sub-scales on each measure.

2. There will be a high correlation between TMS Decentering and EQ Decentering as they aim to measure the same facet.

Research question II:

Do those who meditate have higher mindfulness scores than those who do not meditate?

Hypotheses:

3. Meditators will have higher mindfulness scores than non-meditators.

Research Question III:

To what extent does meditation experience predict the scores of the different mindfulness sub-scales?

Hypotheses:

4. The scores for all sub-scales will be positively correlated with how long a participant has been meditating.

5. Previous research suggests that FFMQ sub-scales will respond to meditation experience in the following way: FFMQ Observe (Carmody & Baer, 2008; Baer et al., 2004; 2006; Joseffson et al., 2011; Tanner et al., 2009) and FFMQ Non React (Carmody & Baer, 2008; Joseffson et al., 2011) will be most sensitive to change resulting from meditation experience, while FFMQ Describe (Carmody & Baer, 2008; Joseffson, et al., 2011) and FFMQ Aware will be less sensitive to change resulting from meditating experience (Baer et al., 2007).

6. The relationship between FFMQ Observe and FFMQ Non Judge will be different for meditating and non-meditating groups (Baer, 2004; 2006; 2008). There will be a positive correlation between FFMQ Observe and FFMQ Non Judge for meditators, and a negative correlation for non-meditators.

Research question IV:

Which of the following aspects of meditation practice has the most significant effect on total mindfulness score: number of meditation sittings per week, length of each sitting, length of time one has engaged in the practice of formal meditation or meditation style practiced?

Hypotheses:

7. Research (Greene, 2004) suggests that number of meditation sittings per week will be more significant in predicting mindfulness than will length of each sitting.

8. The total mindfulness score will increase relative to amount of meditation experience (how long a participant has been meditating).

9. Style of meditation practiced is expected to predict total mindfulness score.

CHAPTER III

METHODOLOGY

Participants and Recruitment Strategy

The Institutional Review Board at Texas A&M University granted permission for this study. Participants were recruited from two sources: 1) an undergraduate Sports Psychology class offered at Texas A&M University (TAMU); 2) members of the general public in California with meditation experience. For the purposes of this study, non-meditators were defined as individuals who endorsed having "no" meditation exposure, "a little" or a "moderate" amount of meditation exposure in response to a question about their prior experience meditating.

Non-meditating participants

All students enrolled in the Sports Psychology class (Fall 2008) who attended lecture the day the investigator did, were invited to participate in the study. Each student was provided a survey containing a brief introduction to the study, including a consent form (see Appendix A). Students received extra credit for participation, yet their responses were not connected to their participation status. The contact information of the principal investigator and her supervisor were provided to all participants.

Participants completed a brief demographic questionnaire (see Appendices B & C). A total of 141 respondents completed the study. Seven respondents indicated that they had "quite a bit" or "a lot" of meditation exposure, and were therefore deleted from the data-set. Of the remaining 134 participants, (mean age = 20.75 years old, *SD* = 1.17; 56% female) most were Caucasian (79.9%), Christian (87.5%) and single (78.9%). This demographic is consistent with that of the general student body. (For detailed demographic details of the non-meditating population, refer to Table 1.) Regarding meditating experience, 50% of the students reported having no meditation exposure, while 40% reported having "a little"; another 10% had a "moderate" amount. Most students endorsed no exposure to yoga (52%), while 36% had had "a little", 8% had "moderate" exposure, 0% "quite a bit" and 4% "a lot".

Meditating participants

The "Bay Area" in California-otherwise known as greater San Francisco - has a high concentration of meditation centres, mindfulness training facilities, yoga studios, places of Qigong instruction etc. Despite the Texan population being different to the Californian population, it was decided to recruit meditating participants from California for this reason.

While all meditating participants completed the survey online, the principal investigator recruited participation in a number of ways. Namely, she met with contacts at several meditation centres in San Francisco (e.g., Zen Meditation Center, Shambala Meditation Center, San Francisco Buddhist Meditation Center, Rasayan Center), Berkeley (Ananda Meditation Center, Tibetan Nyingma Institute) and Marin (Spirit

Rock, Green Gulch) and requested that information about the study and the need for participants be publicized. Several Christian churches were also contacted (e.g., John Main Christian Meditation and Mercy Centre in Burlingame). Fliers detailing the relevant study information were provided (see Appendix D).

The bulk of the study participants were however recruited via the internet. That is, the principal investigator made a request to several different online forums, such as Craigslist.com (SF Bay Area), Yahoo Groups (Gay Buddhist Fellowship, Insight Meditation Community of Berkley, Meditations Group SF, North Bay Meditators etc) and Yelp.com. Regarding Craigslist, a brief posting was uploaded to request participation from "volunteers" with meditation experience, in the "community" section. The message displayed on Craigslist.com is displayed in Appendix E. Regarding Yelp.com, the investigator invited individuals who had posted reviews of meditation and yoga facilities in the bay area to participate in the study. The brief e-mail description of the study invited potential participants to invite other meditators to participate in the study. Snowball sampling (Davies, 2007) was considered a more appropriate sampling method than random sampling (Kalton & Anderson, 1986) because experienced meditators were considered a unique subpopulation. All online participants were able to link directly to the study on Surveymonkey.com. Participation was voluntary. No compensation was provided. Of the 157 participants that submitted surveys, 87 (55, 4%) were complete. The vast majority of participants who did not complete surveys answered questions pertaining to demographic information and meditation practice, but did not answer any mindfulness survey items. Analyses were performed to assess if there were

significant differences in the demographics of participants who did not complete surveys, versus those who did. Results revealed that there were no significant demographic differences between the two groups. Furthermore, there were no significant differences in amount of meditation experience and number of meditation sitting per week between the two groups.

A detailed frequency break-down of the meditating and non-meditating participants' demographics is provided in Table 1. Pronounced demographic profiles will, however, be highlighted. The meditating participants were 59% female and 41% male with a mean age of 43 (range = 22 - 72). It must be noted, that of the total participants, only 35 reported their respective age due to an error in the on-line survey that was corrected shortly after data collection had begun. Caucasians comprised the vast majority of the group (81%), while 10.8% reported Asian Pacific Islander ethnicity. Religious affiliation was, as expected, markedly different from the Texas students. The predominant religion endorsed was Buddhism or "Buddhist and Other" (combination of Buddhism and other major religion) (42%), followed by no religion (23%), 13% reported being Christian (Roman Catholic, Protestant, Episcopalian) and 8% were Jewish. There was an almost equal representation of married and single participants, 34% and 32% respectively. Almost half the meditating participants reported having a graduate degree (44%), while 25% had an undergraduate degree, 13% had "some" graduate school experience, 14% had "some college" experience and only 2% had a high school diploma. The average pre-tax individual income of the meditating group was $80,400/annum (range $4,800 - $300,000).

Survey items addressing the aspects of meditation practice examined are reflected in Appendix F. The length of meditation experience in the meditating sub-sample ranged from 1-2 months to 21 years or more, with a median of 11-20 years. Most participants had practiced for 5-10 years (21.3%). This study focused on measuring change in mindfulness, rather than assessing how different styles of meditation affected change in mindfulness. For this reason, the study did not further operationalize the meditation experience required. Regarding technique or style, 34% subscribed to concentrative meditation (focusing attention on breath, an image or sound, such as a mantra), 26.8% mindfulness/insight (focusing attention on general experience), 23.5% endorsed Vipassana meditation, 11.2% Zen meditation, 22.1% "blend of different types", 10.1% identified "other" which typically reflected Christian (e.g., centering prayer) or Jewish prayer ritual (e.g., tefila). Table 2 shows the frequency break-down of meditation styles. The styles were further grouped into the following categories: "none"; "other" (other, blend of styles and I don't know); "mindfulness" (mindfulness, vipassana, zen, shambhala); "concentrative" (concentrative and transcendental). Mindfulness meditation, vipassana, zen and shambhala were grouped together because instruction follows the basic principle of focusing on heightening attention to a range of foci, such as the breath, sensory experience, thoughts, feelings and bodily sensations, with a stance of accepting whatever arises. Alternatively, concentrative and transcendental practices focus attention on a single point of awareness such as a word or phrase, a candle flame, or even one's own breathing. The majority of the participants meditated 5-7 times per week, median is also 5-7 times per week, ranging from 1-3 times

per month to 3-4 times per day. Regarding the amount of time spent in each meditation, most participants (30.6%) reported average sitting of 16-20 minutes, median = 26-30 minutes, and range was 1-3 minutes to 90+ minutes per sitting.

Procedure

Non-meditating participants

Each TAMU participant was provided with a hard copy of the survey. The mindfulness items from the three questionnaires (FFMQ, TMS and EQ) were combined, totalling seventy-two items (see Appendices G-I). To control for sequence effects, the surveys were divided into Group A, B or C and the ordering of the surveys was varied per group. Surveys A, B and C were randomly assigned. Participation took approximately 20 minutes. Upon completion of the study, the investigator engaged in a 30 minute lecture addressing the construct mindfulness, its overlap with the concept "flow" and how mindfulness training is applied in the field of sport psychology.

Meditating participants

Participant's url addresses were not tracked, ensuring anonymity. The online study did not control for sequence effects, in the way the control group did and ordered the mindfulness surveys consistently with FFMQ first, TMS second and EQ third, respectively. Administering data collection online is convenient for participants as they were able to complete the study from home, a more private environment, at any time of the day. Furthermore, electronic administration of the instruments also reduced strain on resources, such as room scheduling, parking, and time conflicts, reduction of paper copies and expense, and reduced the need for data entry. Another advantage to online

data collection is that upon receiving the invitation to participate in the study, the individual is already sitting at their computer, thereby increasing the likely of following through with completing the study. Empirical findings suggest that online data collection, usually does not compromise the psychometric properties of measures, and participants are typically not less representative of the general population than those of traditional studies (e.g. Davidov & Depner, 2011; Dennisen, Neumann, & van Zalk, 2010).

Instrumentation

The instructions for each of the measures, the FFMQ, TMS and EQ were "collapsed" into one instruction, so as not to differentiate between instruments. Of the three survey instructions, the FFMQ instruction was considered the most appropriate. It reads, "Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you." This instruction was also more appropriate for the adjusted (trait) TMS, which was changed from past to present tense (discussed later in this chapter). The Likert-type scale also needed to be uniform for all three measures. The FFMQ and EQ already had identical scales, but the TMS scale was adjusted to read 1 = "never or very rarely true" while the original read "not at all", 2 = "rarely true" instead of "a little"; 3 = "sometimes true" rather than "moderately", 4 = "often true" while the original read "quite a bit" and 5 = "very often or always true" while the original TMS read "very much". While this is an important modification for future researchers to note, it was decided that this

adjustment did not compromise the integrity of the TMS and was necessary for the combining of the instruments.

Five Facet Mindfulness Questionnaire

The Five Facet Mindfulness Questionnaire (Baer, Smith, Hopkins, Krietemeyer & Toney, 2006; see Appendix E) was in large part used as it has been shown to be a valid and reliable measure of skills that are cultivated by the practice of mindfulness, both in long-term meditators and in relative novices (Baer, Walsh, & Lykins, 2009). This instrument is one of the most recently constructed mindfulness measures and was born out of an extensive, five-part study by Baer et al. (2006). A specific strength of the FFMQ is its ability to measure five mindfulness facets separately and reliably. For this reason, studies have used the instrument to assess whether some facets are more important than others in explaining changes in psychological functioning.

Items are based on factor analyses of several recently developed mindfulness questionnaires, namely: The Mindful Attention Awareness Scale (MAAS; Brown & Ryan, 2003), the Freiburg Mindfulness Inventory (FMI; Buchheld, Grossman, & Walach, 2001; Walach, Buchheld, Buttenmüller, Kleinknecht, & Schmidt, 2006), the Kentucky Inventory of Mindfulness Skills (KIMS; Baer, Smith, & Allen, 2004), the Cognitive and Affective Mindfulness Scale (CAMS; Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2005), and the Mindfulness Questionnaire (MQ; Hong, 2004).

Baer at al. (2006) then combined the responses from all five instruments into a single data set to systematically assess the responses. An exploratory factor analysis (EFA) established five clearly identifiable factors: observing (Observe); describing

(Describe); acting with awareness (Aware); non-judging of inner experience (Non Judge) and non-reactivity to inner experience (Non React) (see Appendix J). The items that most clearly represented each factor in the analysis (those with the highest factor loadings) were combined to form the Five Facet Mindfulness Questionnaire. The Observe and Non Judge factors were not significantly correlated, and all other correlations among FFMQ factors were between $r = .15$ and $r = .34$ (Baer et al. 2006). The facets were correlated in expected directions with several other variables predicted to be related to mindfulness.

The Observe sub-scale (12-items) is consistent with a conceptualization of mindfulness as a form of reflective awareness and meta-cognitive processing of events. It most closely measures attention, both in reference to a variety of internal phenomena (ex. bodily sensations, cognitions, emotions) and external phenomena (ex. sights and sounds). As examples, survey items include: "I intentionally stay aware of my feelings", "I notice changes in my body, such as whether my breathing slows down or speeds up" and "When I'm walking, I deliberately notice the sensations of my body moving".

The Describe sub-scale (8-items) refers to applying words or labels to observed phenomena. An example item is "I'm good at finding the words to describe my feelings". Some studies (e.g. Frewen et al., 2010) have not analyzed this factor as it is arguably not centrally related to trait mindfulness, though it is related to emotional intelligence. Not surprisingly, the Describe sub-scale is sensitive to the type of mindfulness training used, for example ACT and DBT emphasize labeling and describing experiences while MBSR does not.

The Acting with Awareness sub-scale (5-items) captures an ability to engage fully in one's present activity rather than act on auto-pilot. Example items include "When I do things, my mind wanders off and I'm easily distracted", "When I'm doing something, I'm only focused on what I'm doing, nothing else".

The Non Judge sub-scale (5-items) refers to taking a non evaluative stance towards thoughts and feelings. Example items include: "I criticize myself for having irrational or inappropriate emotions", "I tell myself that I shouldn't be feeling the way I'm feeling", "I believe some of my thoughts are abnormal or bad and I shouldn't think that way". Frewen et al. (2010) excluded this trait from their study's analyses due to a potential general overlap with traits broadly relevant to neuroticism.

The final sub-scale, Non Reactivity to Inner Experience (6-items) refers to accepting thoughts and feelings and not getting caught up or carried away by them. An example item reads, "In difficult situations, I can pause without immediately reacting." Items on Non Judge and Non Reactivity best capture attitude, a critical element of the mindfulness definition. Both the Non Judging and Non Reactivity to Inner Experience sub-scales use the word *accept* in item stems. Some researchers explain that items using the term *accept* may be less useful than other items in clarifying the facets of mindfulness, perhaps because some respondents may equate acceptance with approval of undesirable conditions or with passive resignation (Linehan, 1993; Segal et al., 2002). Baer, et al. (2006) state that Non Reactivity and Non Judging of Inner Experience are useful facets, and that both may be seen as ways of operationalizing acceptance. That is, to accept an experience, such as feeling anxious, might include refraining from

judgments or self-criticism about having this experience (Non Judging) and refraining from impulsive reactions to the experience (Non Reactivity).

The FFMQ has a total of thirty-nine items. Item responses are measured on a five-point Likert-type scale from 1 (not at all) to 5 (very much). The five sub-scales are adequately to well internally consistent, with alpha coefficients ranging from .75 to .91 (Baer et al., 2008). Baer et al. (2006) administered the new FFMQ to a fresh group of undergraduates to assess whether the factors are part of the same construct and not different constructs. A confirmatory factor analysis (CFA) was performed, using four fit indices. Four of the five sub-scales, all but Observe, consistently correlated significantly to constructs that are expected to be theoretically related to mindfulness, such as emotional intelligence, self-compassion and openness to experience (positive correlations) and experiential avoidance and thought suppression (negative correlations). Furthermore, the CFA found that Describe, Act with Awareness, Non Judge and Non React express an overarching mindfulness construct, and that three of those sub-scales, all but Describe, were shown to have incremental validity in the prediction of psychological symptoms.

Both expected and unexpected relationships manifested between the Observe sub-scale and psychological variables. In 2008, Baer et al. performed a follow-up study to confirm that the usefulness of the Observe sub-scale is related to meditation experience. The results suggested that the Observe sub-scale may be sensitive to changes with meditation practice that alter its relationships with other variables (Baer et al., 2008). For example, items on the Observe sub-scale are negatively correlated with

mindfulness for people who do not meditate (Baer et al., 2004; Baer et al., 2006). A different study showed that Observe was not predictive of psychological adjustment in non-meditating samples (Baer et al., 2008). Baer et al. (2006) assert this is consistent with results obtained during the development of the KIMS (Baer et al., 2004).

A likely reason for this finding stems from mindfulness training's tendency to emphasize close observation of internal stimuli, while teaching participants to observe them with an accepting, non-judging, and non-reactive stance, even if they are unpleasant. Responding in these ways to negative thoughts and feelings appears to be uncommon in Western culture (Hayes, Strosahl, & Wilson, 1999; Segal, Williams, & Teasdale, 2002). Thus, close observation of internal experience may be maladaptive in the general population but adaptive when it is done mindfully (Baer et al., 2008). Therefore, items related to the Observe sub-scale are likely to be useful in determining mindfulness for people who meditate on a regular basis because they are able to observe their experiences without judging them (Baer et al., 2006).

An alternative explanation offered by the authors of the instrument is that the content of the Observe items do not adequately capture the quality of noticing or attending to experience that is characteristic of mindfulness (Baer et al., 2006). Several of the items included on the Observe sub-scale address external stimuli (sounds, smells, etc.) and bodily sensations, whereas the other facets are concerned primarily with cognitions and emotions or while functioning on automatic pilot. The same authors suggest that perhaps Observe items with similar content to the other facets would show more of the expected patterns. Another explanation for the unusual behaviour of Observe

is that it is moderated by a willingness to engage in meditation or openness to experience in general (Carmody et al., 2009).

Toronto Mindfulness Scale

The current study adapted the Toronto Mindfulness Scale (TMS; Lau et al., 2006) to measure trait-mindfulness. The TMS, another valid and reliable measure of mindfulness, was born out of an extensive two-part study and is also one of the newest mindfulness instruments. It measures the capacity to be aware of sensations, thoughts, and feelings with an attitude of curiosity and acceptance (Lau et al., 2006). The TMS was designed to assess mindfulness as a state that can vary across a short period of time (Lau et al., 2006) unlike most other trait-type mindfulness instruments. The first part of the study had a team of researchers (Bishop et al., 2004) derive forty-two items reflecting the operational definition of mindfulness. Both meditating and non meditating participants (n = 390) were asked to sit quietly, paying attention to their breath, thoughts sensations and feelings for 15 minutes before completing the instrument. Item responses were measured on a 5-point Likert-type scale from 1 (not at all) to 5 (very much) and are worded to evoke a mindful state by asking respondents to rate their retrospective experience. An exploratory factor analysis yielded two clear sub-scales, Decentering and Curiosity.

Regarding the factors, Curiosity refers to an individual's general desire to learn more about their experience. Decentering relates to not personally identifying with thoughts or feelings rather than being overly absorbed in one's internal experiences (Lau et al., 2006). The 13 items that most clearly represented each factor in the analysis (those

with the highest factor loadings) were combined to form the TMS. Internal consistency reliability (coefficient alpha) for the scales was .88 (Curiosity) and .84 (Decentering). Lau et al. (2006) validated the instrument using a meditating population. Construct validity was demonstrated by showing higher TMS factor scores following mindfulness training (Davis, Lau, & Cairns, 2009).

Most of the relationships with other constructs were as expected (Lau et al., 2006). More specifically, both Curiosity and Decentering significantly and positively correlated with absorption (the ability to maintain a state of attentional involvement on current experience), and awareness of one's surroundings; however, only Curiosity correlated significantly with awareness of internal states (thoughts and feelings). Neither sub-scale correlated significantly with dissociation, which involves altered states of consciousness such as feelings of merging or depersonalization along with a lack of awareness of one's own experience (Putnam, 1985). Cognitive failures (e.g., attention drifting while reading, forgetting why one chose to move from one part of his or her house to the other) correlated negatively with Decentering but were not significantly correlated with Curiosity. This pattern of findings generally confirms that the TMS measures a heightened focus of attention to internal states and to a lesser degree one's environment (Lau et al., 2006). Furthermore, both sub-scales are significantly and positively correlated with reflective self-awareness and psychological mindedness (the ability to reflect upon and understand the meanings and motivations for one's thoughts, feelings, and behaviors (Conte, Ratto, & Karasu, 1996). Somewhat unexpectedly, and interestingly, only the Decentering sub-scale was positively correlated with openness to

experience, which reflects an open attitude towards one's experience. Neither sub-scale correlated significantly with ruminative self-focused attention, self-consciousness, and social desirability, although there was a significant positive correlation between Curiosity and self consciousness. This general pattern of findings suggests that the TMS measures "a reflective, introspective self-awareness" that diverges from constructs such as rumination and dissociation (Lau et al., 2006, p. 1455). Moreover, given the weakness of the significant correlations, the results of the correlation analyses support the discriminant validity of the TMS in relation to the other constructs (Lau et al., 2006).

The benefits of a state-mindfulness instrument is that it increases reliability and validity and minimizes error attributable to memory bias (Ericsson & Simon, 1980; Klinger, 1978; Singer & Kolligian, 1987), though it makes administration of the measure in research protocols more time intensive, and this type of administration is not feasible for all research designs (Davis, Lau, & Cairns, 2009). The authors of the instrument recommend multiple assessments, as it cannot be assumed that a mindful state reached in one sitting equates with that of another sitting. Another drawback to the TMS is that when used along-side other mindfulness instruments, ordering of the instruments must be considered. That is, because the TMS requires that participants be guided to a mindful state, it needs to be completed after other mindfulness instruments that are typically designed to measure trait-mindfulness. Not doing so could affect results of the other mindfulness measures.

It is for this reason that the current study adapted the TMS to measure trait-mindfulness by rewording the past-tense item stems to the present tense. For example,

instead of item 8 reading “I was more invested in just watching my experiences as they arose, than figuring out what they could mean”, the item read “I am more invested in just watching my experiences as they arise, than figuring out what they could mean”. Interestingly, in 2009 Davis, Lau, and Cairns developed a trait version of the TMS which is identical to the one used in this study.

Davis et al. (2009) validated the trait-TMS on meditators and non-meditators. Results of their study showed that the internal consistency for TMS sub-scales, Curiosity and Decentering, in the trait and state versions were not significantly different. Furthermore, Davis et al. compared the trait-TMS to six other trait mindfulness self-report measures: MAAS, FMI, KIMS, CAMS-R, SMQ, and FFMQ. Both trait-TMS sub-scales were positively correlated with the other measures, although the correlations were generally higher for Decentering than Curiosity. The study assessed that mean scores for Decentering and Curiosity were higher for meditators versus non-meditators. Interestingly, the researchers found there to be no increase in curiosity scores as meditation experience increased, though both Davis et al. (2009) and Lau et al. (2006) found that meditators had higher average scores on Curiosity than non-meditators. Interestingly, non-meditating males had significantly higher Decenter scores (F [1, 216] = 3.69, p = .048) (M = 12.95, SD = 4.79) than did females (M = 11.54, SD = 4.56). While it remains to be determined whether the Curiosity sub-scale may be measuring a previously unassessed aspect of mindfulness, the trait-TMS permits comparisons with other trait-based measures (Lau & Yu, 2009).

Experiences Questionnaire

The Experiences Questionnaire (EQ; Teasdale, unpublished) measures *decentering*, the ability to observe one's thoughts and feelings as temporary, objective events in the mind (Fresco et al., 2007). Initial efforts to measure the construct, began with the Measure of Awareness and Coping in Autobiographical Memory (MACAM; Moore, Hayhurst, & Teasdale, 1996), an instrument used to capture the construct metacognitive awareness. However, administration of the MACAM was tedious and very time-consuming, prompting Teasdale to devise a new measure, the Experiences Questionnaire. The EQ, a self-report measure of *decentering* is a relatively brief, practical measure originally constructed to measure change prompted by the psychotherapy process in MBCT. Fresco, Moore et al. (2007) explained that the measure wasn't designed to be a measure of mindfulness and that mindfulness and *decentering* are related, but distinct constructs.

The instrument did not undergo rigorous psychometric evaluation, but was further investigated and developed by Fresco, Moore and colleagues (EQ; Fresco et al., 2007, see Appendix H) using exploratory and confirmatory factor analysis in two large samples of college students and clinical populations. The original EQ had two sub-scales, Rumination (6 items) and Decentering (14 items). Rumination items (e.g. "I think over and over again about what others have said to me") were included to help rule out the possibility that increases in wider perspective might be explained by an acquiescent response bias. However, Fresco et al. (2007) found that the Rumination sub-scale was found not to be psychometrically sound and a single, unifactorial *decentering* construct

emerged. Examples of Decentering items include “I can observe unpleasant feelings without being drawn into them” and “I can separate myself from my thoughts and feelings”. Responses are measured on a five-point Likert-type scale (1 = never, 5 = all the time).

Fresco et al. (2007) found that the 11 item sub-scale Decentering fit males and females equally well, and shows good internal consistency of .83. The convergent and discriminant validity of the Decentering sub-scale was demonstrated in negative relationships with measures of depression symptoms, depressive rumination, experiential avoidance, and emotion regulation (Fresco et al., 2007). Interestingly, depressed patients in remission showed lower Decentering scores than a healthy control group. Furthermore, levels of Decentering significantly correlated with current self-reported and clinician rated levels of depressive symptoms. Therefore, the EQ’s Decentering sub-scale appears to have good psychometric properties.

Data Analysis

First, a chi squared test was employed to test whether there were differences in the frequencies between meditating and non-meditating groups. Second, correlations enabled comparisons between the three measures (full-scale and sub-scale). Third, multiple regressions were run to assess whether aspects of meditation practice are related to total mindfulness score.

CHAPTER IV

RESULTS

Two hundred and ninety-eight participants completed the self-report measures, 157 meditators and 141 non-meditating students. Two meditating participants indicated having no meditating experience, and were therefore deleted from the data-set. As mentioned in the methods section, seven non-meditating participants were deleted from the analyses due to having meditation experience. One meditating participant was also removed due to scoring inconsistent answers with the remaining participants, thereby skewing the regression. It was unclear whether this participant was genuinely different than the other participants, or was in fact falsifying data. The final sample size was therefore 288, 154 were meditators and 134 were non-meditators.

A chi-squared test was used to determine whether there were differences in frequencies between the meditating and non-meditating groups. Findings demonstrated that there were no significant differences in gender ($p = .47$), while there were significant differences reflected in race/ethnicity ($p < 0.01$); religious affiliation ($p < 0.01$) and relationship status ($p < 0.01$). The differences as relates to race/ethnicity and religious affiliation should be interpreted with caution because two cells have an expected count of 5 which makes the test unreliable. It is therefore to be noted that the two groups differed significantly according to relationship status. More specifically, the undergraduate control group tended to be single, while the meditating population represented the "married" and "single" categories almost equally. The ethnic composition of both groups was predominantly Caucasian, though 10.8% of the

meditating participants were Asian Pacific Islanders. Regarding religion, the student population was predominantly Christian, while the majority of the meditating population were Buddhist or a combination of Buddhist and another religion.

How do the Three Self-report Measures Compare to One Another?

Correlations were used to compare the three self-report measures (full-scale and sub-scale). As hypothesized, each of the full-scale measures produced statistically significant and positive correlations with each other: FFMQ and TMS, $r = .64$ ($p < .01$); FFMQ and EQ, $r = .71$ ($p < .01$); and TMS and EQ, $r = .56$ ($p < .01$). Furthermore, all sub-scale correlations also yielded statistically significant ($p < .05$) and positive relations. Sub-scale correlations ranged from $r = 0.19$ (FFMQ Non Judge; FFMQ Observe) to .70 (FFMQ Non React; EQ Decenter). Contrary to the hypothesis that TMS Decentering and EQ Decentering would be highly correlated, results revealed the two sub-scales were only moderately high correlated ($r = 0.61$). The full-scale and sub-scale correlation matrix is presented in Table 3.

Do those who Meditate Have Higher Total Mindfulness Scores than those who do not Meditate?

All three mindfulness surveys were totalled to calculate a total mindfulness score (TOTMF). Non-meditating students scored a minimum TOTMF score of 144 and a maximum of 254 ($M = 201$; SD = 18.9). While meditating participants scored a minimum TOTMF of 118, a maximum of 292 ($M = 230$; SD = 33.5). The t-test confirmed that meditators were more mindful than non-meditators, t (147.50) = -7.82, $p < .01$. Regression analyses were used to answer the question "Do those who meditate

have higher total mindfulness scores than those who do not meditate?" regardless of demographic background. As previously mentioned, seventy on-line (meditating) surveys were incomplete and were therefore removed list-wise from the regression. The vast majority of incomplete surveys can be attributed to participants answering questions pertaining to demographics and meditation practice, but omitting all mindfulness assessment questions. The demographic profile of participants who completed the survey and participants who did not complete it were not significantly different. The first multiple regression examined whether "group" (meditating and non-meditating) predicted TOTMF (Table 4). Demographic variables were entered into the regression first so as to control for the effects of demographic variables. More specifically, the aim was to examine the effects of meditation experience over and above the possible effects of demographic variables. Therefore, independent variables consisted of "gender", "racial/ethnic identity", "religious affiliation" and/or "relationship status". Participants' age was not able to be included in the analysis due to a glitch in the on-line data collection survey. Regression analyses require that variables either be continuous or categorical with only two categories. For this reason, variables such as "religious affiliation" and "relationship status" had to be split into a number of (dummy) variables with two categories. In dummy coding, one group is coded as the baseline or reference group. For example, in religion, the baseline category selected was "none" (no religious affiliation), producing the following categories: "Christian versus None"; "Jewish versus None"; "Muslim versus None"; "Hindu versus None"; "Other Religion versus None" and "Buddhist & Other Religion versus None". For "relationship status" coding, the

baseline category chosen was “single” and the comparisons included, “Single versus Dating”, “Single versus Married”, “Single versus Divorced”, “Single versus Living with Partner”, “Single versus Other”. “Gender” and “racial/ethnic identity” were found not to be significant in predicting total mindfulness, while “relationship status” and “religious affiliation” were significant in predicting total mindfulness. These findings suggest that “religious affiliation” was significant in predicting mindfulness ($\Delta R^2 = .099$; F (1; 186) = 20. 50, $p < .01$). “Relationship status” was also significant in predicting mindfulness ($\Delta R^2 = .083$; F (1; 185) = 18.69, $p < .01$). However this finding was likely because of the significant differences between the two groups-that is, the non-meditating group was predominantly “single” and Christian, while in contrast many of the meditators were married and Buddhist. “Group” (meditating and non-meditating) was then added as an independent variable. It was established that the act of meditating further predicts mindfulness $\Delta R^2 = .071$; F (1, 184) = 17.54, $p <.01$. In other words, meditators did have higher mindfulness scores than non-meditators, even when taking in to account demographic differences.

To what Extent does Meditation Experience Predict the Scores of the Different Mindfulness Sub-scales?

The following components of meditation practice were selected as the independent variables for the third multiple regression: how long a participant had engaged in meditation practice (how long), the number of meditation sittings per week (sit/wk), and the style of meditation practiced (style). These independent variables were selected because each had proved significant in predicting TOTMF. More meditation

experience predicted higher scores on all eight sub-scales. Furthermore, meditation experience predicted a roughly similar amount of variance in each of the sub-scales. As hypothesized, FFMQ Observe and FFMQ Non React were the sub-scales that were predicted the most, while FFMQ Describe and FFMQ Aware were less well predicted by meditation experience. TMS Decenter was the other sub-scale to respond most to meditation experience. All the sub-scales were also predicted by style of meditation except for FFMQ Observe, FFMQ Describe and TMS Curiosity. (See Tables 5-20 for results).

Findings from previous studies suggested examining the relationship between FFMQ Observe and FFMQ Non Judge. Separate regressions were run for groups meditating and non-meditating and findings revealed similar circumstances to these previous studies. That is, there was a positive correlation between FFMQ Observe and FFMQ Non Judge for meditators, $r = .422$, and a negative correlation for non-meditators was $r = -.277$.

Which of the Following Aspects of Meditation Practice Are Most Predictive of Total Mindfulness Score: Number of Meditation Sittings per Week (sit/wk), Length of Each Sitting (time/med), Length of Time One Has Engaged in the Practice of Meditation (How Long) or Meditation Style (Style)?

Regarding style of meditation, and as explained in the methods section, meditation styles were grouped as follows: “none”, “other” (other, blend of styles, and I don’t know), “mindfulness” (mindfulness, vipassana, Zen, Shambhala), or “concentrative” (concentrative and transcendental). Style of meditation is categorical in

nature and was therefore translated into dummy variables. No meditation experience ("none") was selected as the reference group. The groupings were therefore as follows: "None versus Other"; "None versus Concentration"; "None versus Blend" and "None versus Mindfulness".

All the independent variables had non-zero correlations with TOTMF. As hypothesized, number of sittings per week had a higher correlation with mindfulness than length of sitting. The correlation matrix showed that the following pairs of independent variables had high correlations – "sit/wk" & "time/med" (r = .76); "sit/wk" & "how long" (r = .79); "time/med" & "how long" (r = .80). All were above .70 indicating multicollinearity (Field, 2009). "Time/med" was therefore eliminated from the regression as it was not as significant as "sit/wk" and "how long". Furthermore, "sit/wk" and "how long" were entered into the regression as a block variable to further reduce multicollinearity. "Sit/wk" and "how long" were entered as the first step of the regression and "style" was entered second. "Sit/wk" and "how long" were significant in predicting overall mindfulness R^2 = .359; F (2; 224) = 62.62, p < .01. Therefore, as hypothesized the number of months or years meditation is practiced is related to the total mindfulness score. Furthermore, the style of meditation practiced did predict overall mindfulness, ΔR^2 = .068; F (4; 220) = 6.52, p < .01. The mindfulness style was associated with the highest TOTMF scores, "Blend" was also associated with a higher mindfulness score, as was "Concentration". The combination of "sit/wk", "how long" and "style" of meditation explained 43% of the variance of total mindfulness, F (6; 220)

= 27.28, $p < .01$. Overall, "how long" a participant has been practicing formal meditation is the most significant predictor of TOTMF ($\beta = .69$, $p < .05$). See Table 21.

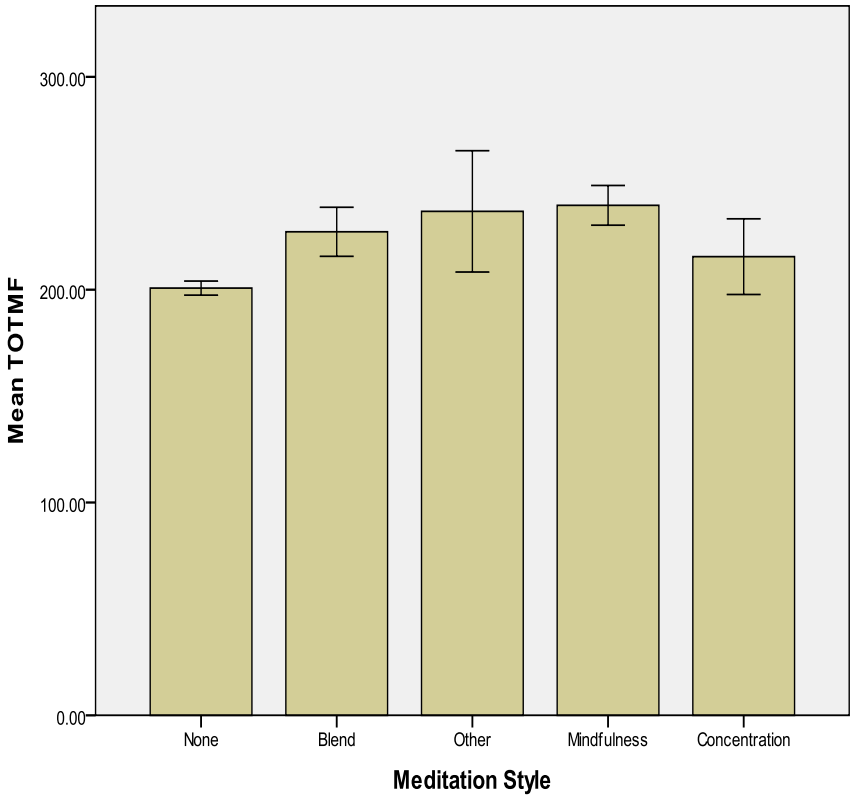

Figure 1. Does meditation style affect overall mindfulness? Mindfulness meditation (combination of mindfulness, zen, vipassana and shambhala) predicts highest overall mindfulness score. A one-way annova showed that mindfulness differed significantly between different meditation styles (F (4; 222) = 21.558, $p < .01$). More specifically, mindfulness meditation was significantly higher than "concentrative" ($p = .04$) and no meditation style ($p < .01$) but did not differ from "blend" ($p = .46$) or "unknown" styles ($p = 1.00$). The only significant difference between meditation styles was between mindfulness and concentrative styles.

CHAPTER V

CONCLUSIONS

Discussion of Results

This project sought to compare three self-report mindfulness measures, namely the FFMQ, TMS and EQ. Additionally, the work aimed to establish whether those who meditate have higher total mindfulness scores (TOTMF), as measured by the above-mentioned mindfulness measures. Also, it was assessed how meditation experience affects the mindfulness sub-scales, more specifically which of the sub-scales respond most or the least to the practice. Lastly, the project examined different aspects of meditation practice (style of meditation; number of meditation sittings per week; length of meditation per sitting and length of time meditation has been practiced) assessing which of these most affects total mindfulness.

Overall, these findings established that the three mindfulness measures demonstrate high convergent validity. That is, mindfulness as measured by the FFMQ, TMS and EQ are related to one another. Secondly, the results showed that mindfulness, as measured by these self-report measures does increase with meditation experience. Furthermore, it was established that all the sub-scales responded to meditation experience in a roughly similar amount. Lastly, it was established that the most significant aspect of meditation practice in predicting total mindfulness score is the length of time a person has engaged in formal meditation practice. The number of times

a person meditates per week and the style of meditation practiced also predicts total mindfulness, but to a lesser extent. Each of these findings will be discussed in turn.

How do the Three Self-report Measures Compare to One Another?

Generally, this study's findings replicated those of previous studies with regard to approximate magnitude of correlations (Baer et al., 2004, 2006). The first hypothesis proposed that each of the measures, full-scale and sub-scale, would have modest to high correlations because while the facets have been shown to measure distinct content (e.g., Baer et al., 2006; Lau et al., 2006), they are all derived from questionnaires designed to measure mindfulness. This hypothesis was confirmed.

Full-scale performance

Two analyses were performed, that is each of the instruments were compared to one another, and each of the instrument's full-scale scores were correlated to the total mindfulness score (TOTMF = combined scores of FFMQ; TMS and EQ). Each of the instruments was found to be highly correlated to the other, providing support for convergent validity. The full-scale scores correlated to TOTMF as follows: FFMQ .96, EQ .81, and TMS .79. While these correlations are high, and the FFMQ reflects the highest correlation to TOTMF, it is important to factor in the number of survey items (FFMQ has 39 items, EQ has 20 items and TMS has 13 items). That is, the more items per instrument, the more inflated the correlation because it reflects that the instrument is related to itself. Therefore, although FFMQ has the highest correlation, it cannot necessarily be interpreted as being the best measure of mindfulness. Overall, the

correlations suggest that the three measures are comparable in their ability to measure mindfulness.

Establishing convergent validity is valuable as it would afford credibility to existing research using the FFMQ, TMS and EQ. These results suggest that the instruments seem to measure the same construct. If it is in fact established that the instruments do measure the same construct, they could used fairly interchangeably. Establishing convergent validity would also allow for the results from one instrument to be cautiously extrapolated to that of another.

Sub-scale performance

This section details how the various sub-scales relate to one another, focusing on particularly high or low sub-scale correlations; TMS Decenter, EQ Decenter, FFMQ Observe, FFMQ Non Judge, TMS Curiosity and FFMQ Describe.

Decentering. Hypothesis two proposed that Decentering as measured by TMS and EQ would be highly correlated, as they aim to measure the same aspect of mindfulness. Results revealed only a moderately high correlation ($r = 0.61$). A closer look at the TMS and EQ Decentering sub-scales (see Appendix I) reveals distinct differences in the content, shedding light on why the correlation is not higher. The TMS items consistently address meta-cognitions, i.e. focus on relationship to thoughts and feelings. They are more "precise" and directive and focus on the *process* of *decentering* (e.g. "I am more invested in just watching my experiences as they arise, rather than in figuring out what they could mean"). They are also less accessible to individuals who are not trained in mindfulness or cognitive therapy. Other items include "I am more

concerned with being open to my experiences than controlling or changing them"; and "I am aware of my thoughts and feelings without over-identifying with them".

Alternatively, EQ Decenter items reflect a larger range of concepts that are likely to be more accessible to individuals who are not psychologically sophisticated. For example, "I notice that I don't take difficulties so personally"; "I can slow my thinking at times of stress" and "I can treat myself kindly". EQ items also address the *consequences* or *results* of *decentering*, and more specifically the benefits of *decentering*. Another marked difference between the two sub-scales is that most of the TMS items begin with "*I am*…", while many EQ items read "*I can*…" For example, "I am more concerned with being open to my experiences than controlling or changing them" versus "I can separate myself from my thoughts and feelings". The former refers to a *process* or a technique of awareness, whereas "*I can*" items hint at an agenda, and perhaps even an assessment process. Interestingly, this contradicts a central aspect of mindfulness - that of non-judging. In general, while TMS and EQ Decenter share a moderately high correlation, they also differ in meaningful ways.

Strikingly, *decentering* is explicitly measured by the TMS and EQ, but the FFMQ does not have a *decentering* sub-scale. This is meaningful given that d*ecentering* is a crucial element of the mindfulness process. Given that the full-scale correlations of all three instruments are so high, and that *decentering* is explicitly measured by the TMS and EQ, it is reasonable to believe that the FFMQ does measure *decentering*. A closer look at the sub-scale correlations facilitates understanding how the FFMQ measures the construct.

Decentering and mindfulness as measured by FFMQ are highly correlated (TMS Decenter and FFMQ (total), $r = 0.62$; EQ Decenter and FFMQ (total), $r = 0.71$). This finding reflects the general agreement that there is an overlap in the definitions of mindfulness and *decentering* which needs to be clarified and further researched (Carmody, Baer, Lykins, & Olendzki, 2009; Sauer & Baer, 2010). Of the five sub-scales of the FFMQ, FFMQ Non React produced the highest correlation to both TMS Decenter and EQ Decenter (TMS Decenter and Non React, $r = 66$; EQ Decenter and FFMQ Non React, $r = .70$). Example FFMQ Non React items are "I perceive my feelings and emotions without having to react to them" and "In difficult situations, I can pause without immediately reacting". Of the five FFMQ sub-scales, FFMQ Non Judge is the second most correlated to both TMS Decenter and EQ Decenter (TMS Decenter and FFMQ Non Judge, $r = 0.46$; EQ Decenter and FFMQ Non Judge, $r = 0.55$). Example FFMQ Non Judge items are "I tell myself I shouldn't be feeling the way I'm feeling"; "I make judgments about whether my thoughts are good or bad." Given these results, it seems that the FFMQ does measure *decentering*, though it is captured by more than one of the sub-scales, with FFMQ Non React and FFMQ Non Judge being two of the five sub-scales most related to *decentering*.

One way of conceptualizing the *decentering* and FFMQ Non React relationship is that *decentering* (detaching or being more objective of one's experience) affords an individual the opportunity to *decide* whether or not they *choose* to react to their thoughts and feelings. Similarly, *decentering* and FFMQ Non Judge are highly correlated because when in a *decentered* state, an individual is more inclined to recognize the limitations of

being human, and therefore more able to have compassion for the self, and less likely to criticize and judge oneself.

Also, it is important not to assume that because the sub-scales are labelled Non React and Non Judge, that non-reacting and non-judging are assumed to be more aligned with being mindful. That is, it is not assumed that reacting and judging undermine the mindfulness process. Instead, a closer look at the survey items shows that Non React refers to *choosing* an appropriate reaction or judgment, rather than being at the mercy of habit. Instead the emphasis is on *how* one reacts or judges. For example, if an interaction transpires in which an individual perceives having been treated inappropriately, if after *decentering*, the individual chooses to react, while doing so in a compassionate manner, such a decision would be congruent with the mindfulness concept. That is, *reacting* and *judging* do not necessarily undermine high mindfulness.

FFMQ Observe and FFMQ Non Judge. As mentioned in the results, the relationship between FFMQ Observe and FFMQ Non Judge was different for non-meditating and meditating populations, similar to previous findings (Baer et al., 2004; 2006; 2008). That is, the correlation between FFMQ Observe and FFMQ Non Judge was $r = -.277$ (non-meditators) and $r = .422$ (meditators). Similarly in the development of the KIMS, FFMQ Non Judge and FFMQ Observe were significantly negatively correlated in a non-meditating population (Baer et al., 2004). In the development of the FFMQ, again a non-meditating population produced a negative correlation, $r = -0.07$, while in the same study, a meditating population produced a significantly different, and positive correlation (Baer et al., 2006). Baer et al. suggested that this low correlation

could be explained by non-meditating individuals tendency to associate attending to experiences (observing) with judging them, where meditators could be expected to show higher levels of both observing and non-judging.

Understanding how FFMQ Observe relates to psychological symptoms and well-being in meditating and non-meditating populations, facilitates understanding the FFMQ Observe, FFMQ Non Judge relationship. Baer (2007) described that meditators' FFMQ Observe scores were significantly and negatively correlated with psychological symptoms and positively correlated with well-being, while the same results for non-meditators were non-significant or had the opposite correlation. Baer proposed that the tendency to attend to internal and external experience seems adaptive in meditators, and neutral or maladaptive for non-meditators. It is possible that the FFMQ Observe, FFMQ Non Judge relationship may be responsible for this phenomenon. More specifically, FFMQ Non Judge may serve as a mediator in the relationship with FFMQ Observe in meditators, allowing FFMQ Observe to perform as a positive and thereby healthy experience.

Tanner et al. (2009) further explained that this pattern could express a phenomenon whereby meditation practice disrupts an otherwise typical association between observation and judgment of thoughts and feelings. Another reason offered by the same researchers is that of a self-selection effect. That is, people for whom observation of internal experience is associated with non-judgmental acceptance are more likely to be interested in taking up meditation. A study by Tanner et al. (2009) further illustrated this matter. The project examined the effect of transcendental

meditation on mindfulness using the KIMS. Importantly, all sub-scales (including FFMQ Observe and FFMQ Non Judge) were positively inter-correlated at pre-treatment. Tanner et al. believe their findings favor the self-selection interpretation, providing the authors with no basis to conclude that meditation changes the associations of mindfulness facets. Tanner and colleagues further explained that finding a significant pre-treatment positive correlation between FFMQ Observe and accept-without-judgment (FFMQ Non Judge) mindfulness sub-scales suggests that this positive association is characteristic of those interested in learning to meditate, as opposed to being a result of instruction and practice of meditation. In summary, longitudinal studies would be useful in clarifying whether meditation increases both observation and acceptance without judgment, or whether FFMQ Non Judge serves as a mediator in the relationship with FFMQ Observe in meditators, allowing FFMQ Observe to perform as a positive and thereby healthy experience; or whether persons more open to meditating characteristically have a combination of high observation along with high acceptance without judging, even before they start meditating.

TMS Curiosity. Regarding the TMS, TMS Curiosity generally showed slightly lower correlations with the other scales and sub-scales than did TMS Decentering, in line with the findings of Davis et al. (2009). This makes sense, given the "overlapping" relationship between *decenter* and total mindfulness and therefore the sub-scales of mindfulness. Also in line with Davis et al., the exception to this pattern was that TMS Curiosity and FFMQ Observe showed a high correlation. The two sub-scales do bear some similarity, particularly because an element of observing or watching is necessary

for heightened curiosity of one's internal process. Furthermore, a close examination of TMS Observe reveals that while most items focus on a heightened awareness (e.g. I pay attention to sensations, such as the wind in my hair or sun on my face.), two of the eight items address a reflective and active mental process (e.g. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.) Such processes do resemble those of a curious mind.

FFMQ Describe. FFMQ Describe has a lower correlation to the other sub-scales in agreement with previous findings (Davis et al. 2009), which also found a small correlation between TMS Decenter and both FFMQ Describe and KIMS Describe. A possible explanation for these results is that some meditation styles such as Vipassana and Zen, utilize labeling or describing as part of the practice, while others do not. Davis et al. explain that it is conceivable that *describing* and *decentering* form distinct aspects of the mindfulness construct. Thus we could expect *describing* to be valued more in mindfulness practices, such as mindfulness meditation, thus producing a higher correlation with other mindfulness facets. Given that the relationships between mindfulness questionnaires and sub-scales have been clarified, this discussion will turn to the effects of meditation on mindfulness.

Do those who meditate have higher mindfulness scores than those who do not meditate?

This discussion examines a frequent assumption in the literature, which is that mindfulness is a skill or type of training that responds to practice (Bishop et al., 2004; Kabat-Zinn, 2003). The current findings show that meditators have higher TOTMF

scores than non-meditators, beyond the effects of demographic variables on mindfulness, thus confirming the third hypothesis. That is, all eight sub-scales, as well as TOTMF, were higher for meditators than non-meditators**.** More specifically, non-meditating students scored a minimum TOTMF score of 144 and a maximum of 254 (mean = 201; SD = 18.9); while meditating participants scored a minimum TOTMF of 118, a maximum of 292 (mean = 230; SD = 33.5). Interestingly, numerically the difference between the two groups isn't as stark as one might expect. However, the difference between the highest scoring participant, a practicing Buddhist monk and the highest scoring "non-meditating" participant, a university student with moderate meditation exposure, is 38 points. It would be interesting to have a concrete understanding of the effect such a relatively small difference has on real life (e.g. coping with stressors).

As mentioned in the results section, in order to establish whether meditation practice significantly affected TOTMF, demographic variables needed to be controlled as a possible reason for the differences between the groups because the meditating and non-meditating groups were inherently so different. In so doing, it was established that religious affiliation and relationship status were found to be significant in predicting overall mindfulness. More specifically, participants endorsing "Buddhist and Other religion" and "married" scored the highest TOTMF. However, this finding is almost certainly a reflection of the differences between the two groups-that is, the non-meditating group is predominantly "single" (78.9%) and Christian (87.5%), while in contrast many of the meditators were married (34.4%) and Buddhist (44%). A possible explanation for the fact that Buddhism is so prevalent within the meditating group is

because meditation is an integral aspect of the Buddhist practice and Buddhism in the West attracts individuals who value mindfulness. It would be interesting to examine mindfulness in Buddhists who do not engage in a formal meditation practice. Interestingly, gender and racial/ethnic group was not associated with TOTMF.

To what extent does meditation experience predict the scores of the different mindfulness sub-scales?

Exploring the relationship between the TMS sub-scales Decenter and Curiosity as they relate to meditators and non-meditators revealed that both sub-scales were higher for meditators than non-meditators. In a similar study by Lau et al. (2006) TMS Decenter increased with meditation experience, but TMS Curiosity only increased with *mindfulness* meditation and not with Shambhala meditation. In a different study, using a wide variety of meditation styles (Davis et al., 2009) TMS Curiosity was found to be higher in meditators, but did not increase per years of meditation experience, after controlling for age and gender. Lau et al. (2006) suggested that these findings can be explained by accounting for the instruction associated with mindfulness-related practices in contrast to other meditation practices. That is, non-secular mindfulness practice as typically taught in a clinical context encourages one to "investigate your distractions" (Rosenberg, 1998, pp.170-171). On the contrary, other forms of meditation, such as concentrative and transcendental are focused on affording the practitioner greater degrees of concentration and attentional focus. That is, when distractions do arise, practitioners are discouraged from taking an active investigative interest in the nature of their thoughts, feelings or sensations, and urged to return to the primary focus of

attention (Dunn, Hartigan, & Mikulas, 1999; Goldstein, 2002). In this study, like the previous two studies mentioned, meditators were more curious (mean = 23.1) than non-meditators (mean = 19.6). However, in contrast to Davis et al. (2009) TMS Curiosity was correlated with years of meditation experience ($p < .02$), as well as with number of meditation sittings per week ($p < .03$). These findings seem to challenge those of Davis et al. (2009) who suggested that TMS Curiosity does not increase upon meditation experience and instead is a characteristic of those who meditate.

The results also challenge those of Lau et al. (2006) as those results did not find meditation *style* to be significant in predicting mindfulness. This could however be a result of grouping the styles into groups, "mindfulness", "concentration", "blend", and "I don't know". Again, longitudinal research would help clarify the contradictory findings.

The fifth hypothesis addressed whether meditating participants would produce higher mindfulness scores in the FFMQ sub-scales specifically, and proposed that FFMQ Observe (Baer et al., 2004; Carmody & Baer, 2008; 2006; Joseffson, Larsman, Broberg, & Lundh, 2011; Tanner et al., 2009) and FFMQ Non React (Carmody & Baer, 2008; Joseffson et al., 2011) would be most responsive to meditation experience while FFMQ Describing (Carmody & Baer, 2008; Joseffson et al., 2011) and FFMQ Awareness would be less sensitive to change resulting from meditating experience (Baer et al., 2006). This hypothesis was not supported as each of the five sub-scales was higher in meditating participants in a roughly similar amount. This suggests that the seven sub-scales and EQ Decenter might be valid facets of mindfulness, after all. Upon closer examination, it is evident that the biggest difference in sub-scales between meditating

and non-meditating participants is reflected in TMS Decenter (r = .63) while FFMQ Aware reflects the smallest difference between the two groups (r = .36). The relatively low increase in FFMQ Awareness resulting from meditation experience could be explained by meditators' increased sensitivity to lapses in awareness, because meditation focuses on exactly this.

A possible explanation as to why FFMQ Describe was higher in meditating participants in this study and was not in Carmody and Baer's study, is because participants in the latter were trained in MBSR. MBSR does not emphasize labeling or describing experiences in the way that ACT and DBT do (Carmody & Baer, 2008). As previously mentioned, some meditation styles, such as Vipassana and Zen, also utilize labeling or describing as part of the practice while others do not. The describe sub-scale is therefore likely to be particularly sensitive to the type of mindfulness training or meditation style. Possibly because participants in this study participated in a wide range of meditation styles, including some that encourage describing as part of the practice, the describe sub-scale was higher in meditating participants.

Aspects of meditation practice and their relation to total mindfulness score

The question of which aspects of meditation practice most increase mindfulness scores has received little attention in the literature. It seems important that this area of research receive given more attention so that the findings can be applied in clinical settings. The following aspects of meditative practice and their ability to predict total mindfulness were examined: How long a participant has engaged in meditative practice (how long); total number of meditative sittings per week (sit/wk); the length of the meditation

sittings (time/med) and the style of meditation practiced (style). Overall, how long a participant has engaged in meditative practice was found to be the most significant predictor of total mindfulness. Meditation style practiced and the number of meditation sittings per week were also significant. Time spent per sitting was significant in predicting mindfulness, but as significant as frequency of sittings. This finding could suggest that *intention* to meditate is more significant than the benefits of engaging in longer meditative sittings. These findings are in line with those of Greene (2004) who found that frequency of meditation was slightly more important than hours meditated in predicting health and stress reactivity. Regarding the effect of length of time that the participant has practiced meditation, it is not clear whether high mindfulness is a product of engaging in meditative practice for a long time, or whether those who continue to commit to meditative practice are innately more mindful. Again, longitudinal studies are needed to clarify this matter.

Style of meditation also significantly predicted mindfulness. Styles "Mindfulness" and "Other" were most predictive of high mindfulness. Style "Concentration" was least predictive of high mindfulness. This finding is not unexpected as concentrative styles enhance deep attention on a single focus (such as hands, breath) therefore discouraging attention of surroundings. On the contrary, mindfulness meditation styles encourage heightened awareness of a comprehensive sensory experience of present moment awareness.

All the mindfulness sub-scales were predicted by style of meditation except for FFMQ Observe, FFMQ Describe and TMS Curiosity. Of the eight sub-scales, TMS

Decenter and EQ Decenter were most sensitive to meditation style. As previously mentioned, the "behavior" of mindfulness sub-scales has been found to be sensitive to the style of mindfulness and meditation training. FFMQ Describe has been shown to increase as a result of ACT and DBT training which encourages labeling of experience, while MBSR does not. Vipassana and Zen meditation styles also encourage labeling experience, while other meditational styles do not. However, it is surprising that TMS Curiosity was not predicted by style of meditation, because previous findings have found differences in curiosity depending on meditation styles. That is, non-secular mindfulness training encourages TMS Curiosity, while concentrative and transcendental meditation does not. Ultimately examining how different meditation styles affect mindfulness sub-scales could allow for improved understanding of the mindfulness construct.

The relationship between *decentering* and mindfulness

Should *decentering* be conceptualized as part of mindfulness, or a consequence of mindfulness? The experience of *decentering* and engaging in curious reflection could be viewed as being in conflict with one another. That is, *decentering* is the process of accessing a part of the self that is *beyond* the mind. Kabat-Zinn (2007) described *decentering* as an experience of simply knowing or perceiving: There is no one perceiving and nothing being perceived, but simply awareness happening (personal communication to Shapiro (2006) in Mechanisms of Mindfulness, p. 6). Such an experience is often described as "indescribable", a "knowing". On the contrary, curiosity is exactly the process of engaging the mind. It could be that some individuals are more prone to *decentering*, but that for those who are less so inclined, naturally; the process of

being mindful, including heightened curiosity, increases the probability of experiencing high *decentering*. Again, this raises the question addressed in the literature review of what exactly constitutes the mindfulness construct. More generally, should the observation component of the mindfulness concept (*decentering*) be conceptualized as the consequence of being mindful rather than the process of being mindful?

Clinical Implications

A consistent assumption in the literature is that mindfulness is a skill or a type of mental training that can be developed with practice (Bishop et al., 2004; Kabat-Zinn, 2003). The results of this study reinforce the understanding that while mindfulness is an innate attribute, it can also be learned. As mentioned in the literature review, there is a range of empirically supported mindfulness-based clinical interventions, such as mindfulness-based stress reduction, mindfulness-based cognitive therapy, dialectical behavior therapy, and acceptance and commitment therapy (Baer et al., 2006; Kabat-Zinn, 2003; Kuyken et al., 2008; Ma & Teasdale, 2004). These programs can be used to prevent and treat a wide range of physical and emotional stressors and disorders (Baer et al. 2006; Miller et al., 1995). More specialized mindfulness-based treatments include mindfulness-based eating awareness training; mindfulness-based relationship enhancement; mindfulness-based art therapy, and mindfulness-based relapse prevention. Mindfulness clinical interventions are also effective at enhancing psychological healthiness, that is building upon existing client strengths, instead of focusing on repairing damage or illness.

The foundation of mindfulness clinical interventions lies in the client developing a fundamentally different relationship to self. Unlike traditional treatments which promote "fixing" or changing problematic cognitions and feelings, clients are invited to observe their experience (cognitive, emotional and sensory) in a curious, non-judgemental, accepting and compassionate manner. This approach allows the client to witness their experience in a more direct and honest way. This intimacy, in turn, and somewhat ironically, facilitates the opportunity to change behaviour. This shift in relationship to self is a process that ideally becomes an aspect of lifelong practice and a process that remains within the power of the individual to initiate and/or utilize (Kostanski & Hassed, 2008). Another unique aspect of mindfulness training is that insight naturally transpires through consistent mindfulness practice and is not something that can be forced.

The context in which mindfulness-based treatments are taught is collaborative and enthusiastic. Practitioners can work individually or in a group setting, and the therapeutic relationship can be traditional or more didactic. It is important that facilitator's embody the above-mentioned relationship to self, that is non-judging, patient, accepting, beginner's mind, non-striving, letting go, non attachment, and trust.

Mindfulness skills may be intuitive to some clients, and less so to others. It is important for the clinician to take the time to explain what mindfulness is and how it can be helpful. This is especially true in more rural or conservative communities where clients may perceive mindfulness practice as incompatible with their religious beliefs (as is evident from a minority of non-meditating participants in this study). Research does

however suggest that clients are interested in mindfulness (e.g., Baer, 2003). The clinician may recognize it to be clinically appropriate to explain how mindfulness and meditation can be helpful in guiding spiritual growth. A mindful way of being can be dramatically inconsistent with how clients have led their lives up to this point and can therefore result in scepticism of the approach. It is important for the clinician to take the time to discuss such resistance with the client. Other clients may struggle with the process of being mindful and may need encouragement to avoid despondence. Engaging in a mindfulness assessment, can provide a baseline mindfulness score, and a user-friendly way to introduce and discuss the construct mindfulness. A multi-faceted instrument, such as the FFMQ, would provide the client with a more detailed description. If *describing* is an important element of a clinical intervention, such as with ACT and DBT, the FFMQ would provide specific assessment of that ability. Similarly, if an assessment of *decentering* is helpful clinically, the TMS or EQ would be a more appropriate assessment choice than the FFMQ.

Providing clients with brief, practical, and active mindfulness techniques can help with confidence building before they try more challenging activities like sitting meditation. A host of mindfulness-enhancing exercises exist such as body scan, sitting meditation, walking meditation, gentle yoga, formal and informal daily mindfulness exercises. It is important that the clinician introduce the client to the various exercises, and discuss which of the exercises is more appropriate to individual clients, thereby increasing the likelihood that the client will adhere to the practice. Clinicians can choose to engage in mindfulness training, one-on-one or in group settings or they can refer

clients to facilities that specialize in mindfulness training. There are also a variety of mindfulness online resources.

All components of mindfulness interact and are helpful for most people; however individuals also tend to be naturally more inclined to different aspects of mindfulness. Psychologists ought to work with clients to identify which aspects of mindfulness are innate to them, as well as understanding how the different experiences of mindfulness inform their overall experience. The mindfulness self-report measures can be helpful in providing information about clients mindfulness "strengths" and "weaknesses". For example, clients who have a low degree of emotional awareness can be encouraged to focus on noticing and experiencing their feelings without judging them or reacting. More specifically, Roemer et al. (2009) demonstrated three mindfulness components that can be used effectively as a form of acceptance-based behaviour therapy to increase mindfulness and decrease experiential avoidance among people with general anxiety disorder. Roemer et al.'s findings are interesting because they suggest that using aspects of mindfulness specifically selected based on clients' presenting concerns can be beneficial. Harvey et al. (2004), Teasdale et al. (2003) and Baer (2007) also highlighted the importance of understanding transdiagnostic processes and their relationship to mindfulness so as to minimize indiscriminate application of mindfulness training. For example, reduction of rumination may be of primary importance in depressive disorders, whereas in anxiety disorders, the reduction of experiential avoidance may be more of a priority.

The findings of this study showed that the number of meditation sittings were significant in predicting mindfulness, where length of time in each sitting was not predictive of mindfulness. This suggests that clinicians administering meditation-based treatments should consider emphasizing the importance of regularity of meditation sittings, rather than the length of meditation. Once a regular meditation schedule has been established, longer meditation sittings can be considered. Interestingly, this approach is consistent with that of encouraging patients to engage in physical exercise routines (e.g., Cox, 1991).

As discussed, mindfulness interventions can be effective in addressing a host of psychological symptoms (e.g., anxiety, emotion regulation), behavioural needs, and physical distress. The final question in the online survey asked how meditation has influenced the participant. Below are some participant responses:

1) *Meditation has transformed all of my experience and my entire life. I was a depressed, self-harming teenager and suffered much neurosis, reactivity and self-concern in my twenties. Now I am 35 and I work in a fast paced urban environment doing psychiatric crisis assesssment and response, and co-workers and patients often remark on how calm I am and whether they can have some of whatever it is that I'm on. Of course I am not on anything, I'm just present in a way that doesn't take any energy. I strongly prefer silence and rarely listen to music or watch movies as I used to. Meditation informs my yoga practice. My life is simply joy now, even as I do work that many people feel is grueling. For the first seven years I sat zazen I hated it and couldn't focus but something kept*

me doing it and zazen, along with practicing Advaita Vedanta style-self inquiry outside of meditation, opened experience into something more vast and glorious than I ever thought could be experienced. After this shift two years ago I left psychotherapy and stopped taking antidepressants and anti-anxiety meds, as I have no need for them. The person who was my Zen teacher has asked me to teach. I write all this because I want people to know that the wisdom that emerges from meditation can truly end suffering. Suffering can be ended. For a long time I did not believe this and I sat more out of some sense of obligation and duty than faith in the possibility of liberation. Everyone must find this within themselves, it cannot be taught, only experienced for oneself, but it is so wonderful that I write this for you.

2) *My life changed dramatically for the better almost immediately after I took my first meditation class. Six months later I was living and working in a meditation center. One year later, after months of whittling my prescription to smaller and smaller doses, I completely dropped my ADD medication, which up to that point had been an incredibly helpful supplement to my well-being. Two years later I had begun a new career in massage therapy, itself a meditative practice, which has proven to be my passion and calling. And now three years later, I can honestly say that every facet of my life; financial, social, romantic, career, physical, mental, emotional, has grown in ways that I could only have fantasized about previously. Life is consistently full of beauty and meaning.*

3) *I am a recovering alcoholic. Mediation has been a foundation for my recovery. It has allowed me to not identify with my thoughts and walk through fearful or difficult situations. I will continue to meditate every day.*

4) *Profoundly. I often say I am the person I am becuase of meditation, yoga and qigong. In a culture so steeped in speed and the material aspects of life I have come to develop a deep sense of my true inner nature, which is so clearly connected to deep wisdom, unconditional compassion, and vibrant pure energy. I have a very established and well honed way to approach inner conflict, as well as conflict with others, allowing for deep levels of emotional and mental healing. I am able to truly feel alive, to love deeply and I have a fuller ability to understand and be present with others. These practices are a way of life for me, a way of living in connection and harmony with all of life. My dream is for all people to be able to live with deep awareness of their nature and to create societies based on that true nature.*

Strengths and Limitations of the Current Study and Future Directions

Important limitations of this study are the differences between the meditating and non-meditating populations. That is, the non-mediating students were comprised of predominantly White, Christian, undergraduate students attending a somewhat conservative institution; while the meditating population was heavily Buddhist, older, represented greater racial/ethnic diversity and as members of the general Californian public, are likely to reflect more liberal political ideals. Future studies could examine meditating and non-meditating groups that are more homogenous as the unique features of both populations question the generalizabilty of these results. A strength however, is that the populations are non-clinical, where a great deal of existing mindfulness research examines specifically Buddhist monks or clinical populations.

This project addressed the effect of gender, race/ethnicity, religious and relationship status on mindfulness but due to a glitch in the on-line data collection survey, age could not be examined as a predictor of mindfulness. Age should be examined in future studies as it is conceivable that it has a significant effect on mindfulness.

A further limitation related to the above mentioned threat to generalizability is that of self-selection and snowball sampling used in the study. Participants were recruited from the "volunteer" section of Craigslist. Individuals choosing to peruse this section could be considered a unique population. One may ask, are such individuals more or less prone to mindfulness?

Another possible weakness is that meditating participants were recruited from individuals already engaged in meditating, of their own volition. This raises questions such as, could there be inherent differences between those that are naturally attracted to meditation? And, if so, could these differences affect mindfulness scores? For example, are mindfulness scores necessarily attributed to meditation experience, or are individuals who are drawn to meditating more likely to express attributes such as heightened awareness of their experience? Addressing this very topic, Tanner et al. (2009) suggests that future research could address this concern by assembling one unselected sample of participants with no meditation experience, measuring mindfulness, and exposing participants to videos or other materials concerning meditation to determine whether interest in meditation moderates the associations among mindfulness facets. Specifically regarding the Curiosity scores, Davis et al. (2009) suggest that future research could involve randomizing individuals to non-meditating and Vipassana versus Zen meditating conditions to help determine whether Curiosity scores differ in relation to the subtle changes in approach of different schools of mindfulness practice versus whether curiosity is simply a characteristic of individuals who choose to meditate.

Another limitation stems from the inter-correlations measuring differences *between* participants (e.g., whether those who score the highest in FFMQ Describe also tend to score higher than other participants in FFMQ Non Judge), and not examining *within*-individual changes in the entrainment of mindfulness skills (e.g., whether for a given person, learning to meditate alters the extent to which fluctuations in observation

of her or his thoughts and feelings are matched by fluctuations in FFMQ Non Judge) (Tanner, 2009). Future studies aught to examine with-in individual differences.

Further limitations to this study relate to the use of self-report measures in general. Most of these limitations were addressed in the literature review. One such consideration is the assumption that mindfulness can be accessed via declarative knowledge, meaning that individuals can directly report on those experiential qualities that constitute mindfulness (c.f. Matthews, Roberts, & Zeidner, 2004). But, what is now well-known, is that we can only know what people are meta-conscious of (what they believe they experience) not the actual contents of their subjective experience (e.g., Schooler & Schreiber 2004; Wilson, 2002).

Another limitation relates to the trait-based nature of the measures used in this project. Trait measures, as compared to state measures, reduce reliability and validity and do not minimize error attributable to memory bias in the way that state measures do (e.g., Ericsson & Simon, 1980; Klinger, 1978; Singer & Kolligian, 1987). However, the state-TMS (Lau et al., 2006) and the trait-TMS (Davis et al., 2009) *have* been found to have high convergent validity with each other and several other mindfulness measures. Therefore, using trait-measures in this project was not considered a significant limitation.

Of particular relevance to this study is subject bias. More specifically, those engaged in regular meditation practice have a long-term personal investment in the practice and are almost certainly aware of the expected benefits and are therefore vulnerable to biasing and inflating their scores. On the other hand, maintaining a regular

meditation practice requires discipline, making it unlikely that people who don't experience significant benefits will continue with the practice. For this reason, it is not entirely unexpected that long-term meditators have a great deal of positive feedback about their meditation practice. If they didn't have this experience, they're likely to have stopped meditating.

Participant response biases are inherent limitations resulting from self-report measures. More specifically, mindfulness experiences are sometimes difficult to report on, especially for participants with no meditation experience. Similarly, Grossman (2008) explains that there are likely to be profound differences among respondents in the semantic understanding of scale items. Prior exposure to meditation instruction provides meditating participants with familiarity with words and concepts used in mindfulness scale items - something non-meditating participants do not have. It is possible, if not likely, that the undergraduate students understand scale items differently than the meditators. Such differences may artificially inflate the effects of mindfulness practice on self-reported mindfulness (Feldman, Greeson, & Senville, 2010). On the contrary, it is also possible that non-meditating participants could under endorse mindfulness items due to the novelty of the words and concepts.

Considering the fairly significant shortcomings of self-report mindfulness measures, this project would have benefitted from using more than one method of assessing mindfulness to provide information that is not biased by self-report. Behavioural observations, proxy reports, narrative data, and experience sampling are some of the methods of assessing mindfulness that may provide more objective

assessments of mindfulness (Shapiro, 2009). It may be possible to adapt existing self-report scales to that purpose, although no such attempts have yet to be published. Another intriguing area for future research is to further explore the measurement of mindfulness in the brain itself, using technology such as functional magnetic resonance imaging (fMRI) or positron emission tomography (PET) scanning (Shapiro & Carlson, 2009).

A particular strength of the current work was that the meditators provided details about *style* of meditation practiced. As highlighted in the discussion chapter, this project and a few others (e.g., Lau et al., 2006; Davis et al., 2009) have shown that specific styles of meditation can affect sub-scale scores. This information can be used to inform mindfulness-based clinical applications. Also, are there ways in which self-report responses are affected by different meditation styles. For example, Vipassana courses teach participants to reduce vulnerability to unpleasant emotional states. Such instruction could lead to under-reporting on items that address negative emotional states. Conversely, mindfulness meditation aims to increase sensitivity to thoughts, feelings, emotions and kinaesthetic sensations, and increased awareness could produce inflated scores on these scales (e.g., Bach & Hayes, 2002; Hayes & Feldman, 2004; Chambers, Lo, & Allen, 2008). This study drew from a wide range of meditation styles, each with a potential response-style-bias. Because of the wide range of meditation styles, grouping was required to perform the regression analyses, which may have prevented recognition of a clearer relationship between the practice and mindfulness.

A weakness of the study was that meditation was not further defined. In other words, participants with "meditation" experience were recruited and asked to identify their style of meditation, without further definition provided. "Meditation" is sometimes understood to mean self-reflection, rather than formal meditation. In future studies meditation aught to be further operationally defined to provide greater consistency.

Because the three measures were combined, survey items were to some degree redundant, thereby increasing the likelihood of fatigue effect or carelessness. For this reason the non-meditating population surveys controlled for sequence effects. The online study (meditating population) however, did not control for sequence effects, and ordered the mindfulness surveys consistently with FFMQ first, TMS second and EQ third. The failure to control for fatigue effects in the meditating population is a further weakness of the study.

A strength of this project was the examination of frequency and duration of meditation practice. This is of particular importance because significant variations exist within the practice of meditating populations. For example, four-year follow-up examinations of practice behaviour among individuals who completed MBSR programs at the University of Massachusetts have shown that many people who claim to meditate actually meditated less than once weekly for prolonged intervals or less than 3 times weekly for less than 15 minutes (Kabat-Zinn, Lipworth, Burney, & Sellers, 1987). However, an aspect of a participants' meditation practice that was not captured in this study, are periods of absence from the practice. As the literature gains clarity on understanding mindfulness, further details regarding participants' meditation practice

behaviour may become more important. Generally, it's important that information such as aspects of meditation practice continue be examined as this practical information is useful clinically.

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APPENDIX A

Table 1

Demographics (meditating and non-meditating)

		Meditating	Non-meditating	F/χ^2	Significance
N		158	134		
Age				-10.53	<.001
	Mean	42.91*	20.75		
	SD	12.43	1.17		
	Range	22-72	18-25		
Gender				0.75	.47
	Male	65	61		
	Female	93	71		
	Missing	0	2		
Race/Ethnicity				16.37	<.001
	White	124	107		
	African -American	1	5		
	Hispanic	2	10		
	Asian	14	4		
	Other	1	8		
Religion				140.40	<.001
	None/Atheist/Agnostic	36	8		
	Christian	21	84		
	Jewish	12	2		
	Muslim	1	2		
	Buddhist & Other religion	66	0		

Other	15	0		
Missing	5	38		
Relationship Status			105.48	<.001
Single	51	105		
Married	54	1		
Dating	6	18		
Divorced/Separated	20	1		
Living w/ Partner	25	6		
Other	1	2		
Missing	1	1		
Education			213.97	<.001
High School	3	0		
Some College	22	134		
College	40	0		
Some Graduate	20	0		
Graduate	70	0		
Other	1	0		
Missing	2	0		

* $n = 35$

Table 2

Frequency break-down of the different meditation styles practiced by meditating participants

Meditation Style	Frequency	Percentage
Blend of styles	43	27.22
"I don't know"	6	3.80
Mindfulness[a]	58	36.71
Concentrative[b]	35	22.15
Other	9	5.70

Note. n = 151 (missing 4.4% of responses)

[a]Mindfulness = mindfulness + vipassana + zen + shambhala

[b] Concentrative = Concentrative + transcendental

Table 3

Correlations between FFMQ Sub-Scales Observe, Describe, Aware, Non Judge, Non React, TMS Curiosity, TMS Decenter and EQ Decenter

	Observe	Describe	Aware	NonJudge	NonReact	TMSCuriosity	TMSDecenter	EQDecenter
Observe								
Describe	0.42							
Aware	0.24	0.25						
NonJudge	0.19**	0.34	0.47					
NonReact	0.46	0.32	0.36	0.53				
TMSCuriosity	0.61	0.37	0.21**	0.21**	0.42			
TMSDecenter	0.49	0.25	0.32	0.46	0.66	0.56		
EQDecenter	0.42	0.41	0.45	0.55	0.70	0.38	0.61	

Note. $N = 228$. All correlations significant at $p < .05$ unless otherwise indicated.

** $p < .001$.

Table 4

Predicting total mindfulness from gender, racial/ethnicity, religion, relationship status and group membership (meditating or non-meditating)

					Change Statistics					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.033[a]	.001	-.004	31.26	.001	0.202	1	188	.654	
2	.034[b]	.001	-.010	31.34	.000	0.010	1	187	.921	
3	.317[c]	.100	.086	29.83	.099	20.501	1	186	<.001	
4	.428[d]	.183	.165	28.50	.083	18.685	1	185	<.001	
5	.504[e]	.254	.234	27.31	.071	17.540	1	184	<.001	2.028

a. Predictors: (Constant), Gender

b. Predictors: (Constant), Gender, Racial/Ethnicity

c. Predictors: (Constant), Gender, Racial/Ethnicity, Religion

d. Predictors: (Constant), Gender, Racial/Ethnicity, Religion, Relationship

e. Predictors: (Constant), Gender, Racial/Ethnicity, Religion, Relationship, Group

f. Dependent Variable: Total Mindfulness (TOTMF)

n = 190

Table 5

Predicting each of the mindfulness sub-scales from "how long" and "sit/wk" (FFMQ, TMS and EQ)

Dependent Variable: FFMQ Observe

Model	R Square	Adjusted R Square	S.E.E.	Change Statistics					Durbin-Watson
				R Square Change	F Change	df 1	df 2	Sig. F. Change	
1	.311[a]	.305	4.64780	.311	55.287	2	245	<.001	
2	.317[b]	.300	4.66436	.006	0.566	4	241	.688	1.941

a. Predictors: (Constant), How long, Sit/wk

b. Predictors: (Constant), How long, Sit/wk, Meditation style Other Versus None, Other Versus Concentration[c], None Versus Blend, None Versus Mindfulness[d]

[c] Concentration = Concentration + Transcendental

[d] Mindfulness = Mindfulness + Vipassana + Zen + Shambhala

S.E.E. = Standard Error of the Estimate

N = 248

Table 6

Correlation coefficients for the regression predicting FFMQ Observe

Model		Standardized Coefficients			Correlations	
		Beta	t	Sig.	Zero-order	Partial
1	(Constant)		63.849	<.001		
	Sit/wk	.189	1.769	.078	.524	.112
	Formal: How long	.385	3.597	<.001	.550	.224
2	(Constant)		62.782	<.001		
	Sit/wk	.196	1.687	.093	.524	.108
	Formal: How long	.433	3.352	.001	.550	.211
	None versus Blend	-.062	-.720	.472	.166	-.046
	None versus Mindfulness	-.004	-.044	.965	.339	-.003
	Other versus Concentration	-.084	-.996	.320	.136	-.064
	Other versus None	-.001	-.012	.991	.064	-.001

* Other = other meditation styles

Table 7

Predicting each of the mindfulness sub-scales from "how long" and "sit/wk" (FFMQ, TMS and EQ)

Dependent Variable: FFMQ Describe

Model	R Square	Adjusted R Square	S.E.E.	Change Statistics					Durbin-Watson
				R Square Change	F Change	df 1	df 2	Sig. F. Change	
1	.145[a]	.138	5.43039	.145	20.864	2	247	<.001	
2	.150[b]	.129	5.45761	.005	0.386	4	243	.819	1.974

a. Predictors: (Constant), How long, Sit/wk

b. Predictors: (Constant), How long, Sit/wk, Meditation style Other Versus None, Other Versus Concentration[c], None Versus Blend, None Versus Mindfulness[d]

[c] Concentration = Concentration + Transcendental

[d] Mindfulness = Mindfulness + Vipassana + Zen + Shambhala

S.E.E. = Standard Error of the Estimate

N = 250

Table 8

Correlation coefficients for the regression predicting FFMQ Describe

Model		Standardized Coefficients			Correlations	
		Beta	t	Sig.	Zero-order	Partial
1	(Constant)		57.780	<.001		
	Sit/wk	.033	.287	.774	.336	.018
	Formal: How long	.351	3.016	.003	.380	.188
2	(Constant)		56.736	<.001		
	Sit/wk	.034	.276	.783	.336	.018
	Formal: How long	.401	2.847	.005	.380	.180
	None versus Blend	-.070	-.774	.439	.096	-.050
	None versus Mindfulness	-.011	-.104	.918	.223	-.007
	Other versus Concentration	-.065	-.740	.460	.088	-.047
	Other versus None	.015	.245	.806	.066	.016

* Other = other meditation styles

Table 9

Predicting each of the mindfulness sub-scales from "how long" and "sit/wk" (FFMQ, TMS and EQ)

Dependent Variable: FFMQ Non Judge

Model	R Square	Adjusted R Square	S.E.E.	Change Statistics					Durbin-Watson
				R Square Change	F Change	df 1	df 2	Sig. F. Change	
1	.163[a]	.156	6.36247	.163	24.085	2	247	<.001	
2	.212[b]	.192	6.22571	.049	3.743	4	243	.006	1.893

a. Predictors: (Constant), How long, Sit/wk

b. Predictors: (Constant), How long, Sit/wk, Meditation style Other Versus None, Other Versus Concentration[c], None Versus Blend, None Versus Mindfulness[d]

[c] Concentration = Concentration + Transcendental

[d] Mindfulness = Mindfulness + Vipassana + Zen + Shambhala

S.E.E. = Standard Error of the Estimate

N = 250

Table 10

Correlation coefficients for the regression predicting FFMQ Non Judge

Model		Standardized Coefficients			Correlations	
		Beta	t	Sig.	Zero-order	Partial
1	(Constant)		47.021	<.001		
	Sit/wk	.188	1.659	.098	.386	.105
	Formal: How long	.230	2.030	.043	.392	.128
2	(Constant)		47.817	<.001		
	Sit/wk	.214	1.827	.069	.386	.116
	Formal: How long	.408	2.952	.003	.392	.186
	None versus Blend	-.199	-2.214	.028	.053	-.141
	None versus Mindfulness	-.073	-.677	.499	.336	-.043
	Other versus Concentration	-.261	-2.979	.003	-.020	-.188
	Other versus None	-.057	-.922	.357	.021	-.059

* Other = other meditation styles

Table 11

Predicting each of the mindfulness sub-scales from "how long" and "sit/wk" (FFMQ, TMS and EQ)

Dependent Variable: FFMQ Non React

Model	R Square	Adjusted R Square	S.E.E.	Change Statistics					Durbin-Watson
				R Square Change	F Change	df 1	df 2	Sig. F. Change	
1	.266[a]	.260	3.85431	.266	45.316	2	250	<.001	
2	.327[b]	.310	3.72179	.061	5.530	4	246	<.001	1.901

a. Predictors: (Constant), How long, Sit/wk

b. Predictors: (Constant), How long, Sit/wk, Meditation style Other Versus None, Other Versus Concentration[c], None Versus Blend, None Versus Mindfulness[d]

[c] Concentration = Concentration + Transcendental

[d] Mindfulness = Mindfulness + Vipassana + Zen + Shambhala

S.E.E. = Standard Error of the Estimate

N = 253

Table 12

Correlation coefficients for the regression predicting FFMQ Non React

Model		Standardized Coefficients			95.0% Confidence Interval for B	
		Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)		62.519	<.001	19.625	20.902
	Sit/wk	.203	1.864	.064	-.020	.708
	Formal: How long	.330	3.022	.003	.128	.605
2	(Constant)		64.381	<.001	19.848	21.101
	Sit/wk	.309	2.704	.007	.142	.903
	Formal: How long	.581	4.627	<.001	.371	.921
	None versus Blend	-.254	-2.992	.003	-5.517	-1.137
	None versus Mindfulness	-.236	-2.349	.020	-4.942	-.434
	Other versus Concentration	-.353	-4.216	<.001	-7.379	-2.680
	Other versus None	-.156	-2.771	.006	-11.050	-1.869

Table 13

Predicting each of the mindfulness sub-scales from "how long" and "sit/wk" (FFMQ, TMS and EQ)

Dependent Variable: FFMQ Aware

Model	R Square	Adjusted R Square	S.E.E.	Change Statistics					Durbin-Watson
				R Square Change	F Change	df 1	df 2	Sig. F. Change	
1	.085[a]	.078	4.85255	.085	11.634	2	249	<.001	
2	.131[b]	.109	4.76944	.045	3.189	4	245	.014	2.110

a. Predictors: (Constant), How long, Sit/wk

b. Predictors: (Constant), How long, Sit/wk, Meditation style Other Versus None, Other Versus Concentration[c], None Versus Blend, None Versus Mindfulness[d]

[c] Concentration = Concentration + Transcendental

[d] Mindfulness = Mindfulness + Vipassana + Zen + Shambhala

S.E.E. = Standard Error of the Estimate

N = 252

Table 14

Correlation coefficients for the regression predicting FFMQ Aware

Model		Standardized Coefficients			95.0% Confidence Interval for B	
		Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)		62.283	<.001	24.659	26.270
	Sit/wk	.044	.366	.714	-.358	.522
	Formal: How long	.254	2.130	.034	.024	.614
2	(Constant)		63.018	<.001	24.870	26.475
	Sit/wk	.139	1.120	.264	-.197	.716
	Formal: How long	.499	3.517	.001	.276	.979
	None versus Blend	-.226	-2.467	.014	-6.071	-.680
	None versus Mindfulness	-.263	-2.448	.015	-6.196	-.671
	Other versus Concentration	-.322	-3.542	<.001	-8.036	-2.292
	Other versus None	-.084	-1.313	.190	-9.729	1.947

Table 15

Predicting each of the mindfulness sub-scales from "how long" and "sit/wk" (FFMQ, TMS and EQ)

Dependent Variable: TMS Curiosity

Model	R Square	Adjusted R Square	S.E.E.	Change Statistics					Durbin-Watson
				R Square Change	F Change	df 1	df 2	Sig. F. Change	
1	.211[a]	.205	3.87131	.211	33.288	2	249	<.001	
2	.230[b]	.211	3.85584	.019	1.501	4	245	.203	1.879

a. Predictors: (Constant), How long, Sit/wk

b. Predictors: (Constant), How long, Sit/wk, Meditation style Other Versus None, Other Versus Concentration[c], None Versus Blend, None Versus Mindfulness[d]

[c] Concentration = Concentration + Transcendental

[d] Mindfulness = Mindfulness + Vipassana + Zen + Shambhala

S.E.E. = Standard Error of the Estimate

N = 252

Table 16

Correlation coefficients for the regression predicting TMS Curiosity

Model		Standardized Coefficients			95.0% Confidence Interval for B	
		Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)		59.725	.000	18.819	20.102
	Sit/wk	.147	1.305	.193	-.123	.607
	Formal: How long	.326	2.886	.004	.111	.590
2	(Constant)		59.304	<.001	18.879	20.176
	Sit/wk	.198	1.678	.095	-.056	.706
	Formal: How long	.403	3.019	.003	.151	.718
	None versus Blend	-.062	-.715	.475	-2.941	1.375
	None versus Mindfulness	-.082	-.824	.411	-3.074	1.261
	Other versus Concentration	-.182	-2.190	.029	-4.933	-.261
	Other versus None	.010	.164	.870	-5.169	6.109

* Other = other meditation styles

Table 17

Predicting each of the mindfulness sub-scales from "how long" and "sit/wk" (FFMQ, TMS and EQ)

Dependent Variable: TMS Decenter

Model	R Square	Adjusted R Square	S.E.E.	Change Statistics					
				R Square Change	F Change	df 1	df 2	Sig. F. Change	Durbin-Watson
1	.305[a]	.299	3.87665	.305	54.088	2	247	<.001	
2	.397[b]	.382	3.64058	.092	9.268	4	243	<.001	1.751

a. Predictors: (Constant), How long, Sit/wk

b. Predictors: (Constant), How long, Sit/wk, Meditation style Other Versus None, Other Versus Concentration[c], None Versus Blend, None Versus Mindfulness[d]

[c] Concentration = Concentration + Transcendental

[d] Mindfulness = Mindfulness + Vipassana + Zen + Shambhala

S.E.E. = Standard Error of the Estimate

N = 250

Table 18

Correlation coefficients for the regression predicting TMS Decenter

Model		Standardized Coefficients			95.0% Confidence Interval for B	
		Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)		59.926	<.001	19.046	20.341
	Sit/wk	.247	2.350	.020	.070	.797
	Formal: How long	.324	3.088	.002	.134	.608
2	(Constant)		63.637	<.001	19.313	20.547
	Sit/wk	.326	3.154	.002	.215	.929
	Formal: How long	.615	5.193	<.001	.437	.971
	None versus Blend	-.263	-3.451	.001	-5.632	-1.539
	None versus Mindfulness	-.231	-2.610	.010	-4.763	-.666
	Other versus Concentration	-.399	-5.357	<.001	-8.264	-3.821
	Other versus None	-.193	-3.626	<.001	-12.638	-3.741

* Other = other meditation styles

Table 19

Predicting each of the mindfulness sub-scales from "how long" and "sit/wk" (FFMQ, TMS and EQ)

Dependent Variable: EQ Decenter

Model	R Square	Adjusted R Square	S.E.E.	Change Statistics					
				R Square Change	F Change	df 1	df 2	Sig. F. Change	Durbin-Watson
1	.103[a]	.095	6.12109	.103	13.948	2	244	<.001	
2	.201[b]	.182	5.82190	.099	7.431	4	240	<.001	1.968

a. Predictors: (Constant), How long, Sit/wk

b. Predictors: (Constant), How long, Sit/wk, Meditation style Other Versus None, Other Versus Concentration[c], None Versus Blend, None Versus Mindfulness[d]

[c] Concentration = Concentration + Transcendental

[d] Mindfulness = Mindfulness + Vipassana + Zen + Shambhala

S.E.E. = Standard Error of the Estimate
N = 247

Table 20

Correlation coefficients for the regression predicting EQ Decenter

Model		Standardized Coefficients			95.0% Confidence Interval for B	
		Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)		71.413	<.001	35.952	37.992
	Sit/wk	.120	1.004	.316	-.275	.847
	Formal: How long	.211	1.763	.079	-.040	.718
2	(Constant)		74.769	<.001	36.381	38.350
	Sit/wk	.245	2.041	.042	.020	1.146
	Formal: How long	.602	4.197	<.001	.513	1.421
	None versus Blend	-.355	-3.721	<.001	-10.108	-3.110
	None versus Mindfulness	-.371	-3.361	.001	-9.785	-2.553
	Other versus Concentration	-.484	-5.241	<.001	-13.701	-6.216
	Other versus None	-.157	-2.577	.011	-19.862	-2.651

* Other = other meditation styles

Table 21

Predicting total mindfulness from aspects of meditation practice

Model	R Square	S.E.E.	Change Statistics					Durbin-Watson
			R. Square Change	F. Change	df1	df2	Sig. F Change	
1	.359[a]	24.04	.359	62.622	2	224	<.001	
2	.427[b]	22.94	.068	6.518	4	220	<.001	2.007

Note. How long = How long one has practiced formal meditation practice

Sit/wk = Number of formal meditation practices per week

Dependent variable: Total mindfulness

a Predictors: (Constant), How long, Sit/wk

b Predictors: (Constant), How long, Sit/wk, Meditation Style Other Versus None, None versus Concentration[1], None versus Blend, None versus Mindfulness[2]

[1],Concentration = Concentration + Transcendental

[2] Mindfulness = Mindfulness + Vipassana + Zen + Shambhala

APPENDIX B

CONSENT

Mindfulness Study

This information will be used for the purpose of better understanding mindfulness. This survey takes approximately 15 minutes to complete. The study requires that you answer some demographic-type questions, as well as questions that relate to your general mindfulness. Both will be used strictly for research purposes. **Do not write your name on the research materials.** All information you provide will be anonymous and will be used only for the purpose outlined herein. Published results of this study will not include any information that would permit readers to identify the participants.

The health care industry has found mindfulness-based interventions to be effective in working with a broad range of populations and symptoms. This study aims to better understand the components of general mindfulness. There are no risks to participating in this research. Additionally, there is no cost to participating in this study, other than the time taken to complete the questionnaire. Thank you in advance for participating. Your time is truly appreciated.

Researcher contact information:

Questions or comments relating to this research should be directed to the principal researcher at kjleinberger@yahoo.com or (415) 359 8360 or her supervisor Dr. Donna Davenport at donnasdavenport@gmail.com.

Returning this survey implies consent to participate in the study.

APPENDIX C

DEMOGRAPHICS (MEDITATORS AND NON-MEDITATORS)

Subject number _____

Gender M ____ F____ Other _____

Age ____

Racial/ethnic identity

____ Caucasian

____ African-American/Black

____ Hispanic-American

____ Bi/multiracial

____ Asian/Pacific Islander

____ Native American

Other _____

Relationship status

___ Single

___ Living with partner

___ Married

___ Divorced

___ Separated

___ Widowed

Other _____

Religious affiliation

____ None

____ Atheist

____ Agnostic

____ Protestant

____ Roman Catholic

____ Jewish

____ Greek/Syrian/Russian Orthodox

____ Mormon

____ Muslim

____ Buddhist

____ Hindu

Other _____

Comments:

Questions regarding this research are welcome and can be directed to kjleinberger@yahoo.com

Thank you for participating in this study. Your time is truly appreciated.

APPENDIX D

DEMOGRAPHICS (NON-MEDITATORS)

Education

____ Freshman

____ Sophomore

____ Junior

____ Senior

____ Fifth Year

____ Sixth Year

Other _____

How much meditation experience do you have?

___ none

___ a little

___ moderate

___ quite a bit

___ a lot

APPENDIX E

FLIER POSTED AT MEDITATION CENTERS

APPENDIX F

Recruitment message posted on on-line sites (ex. Craiglist.com)

MEDITATORS NEEDED-doctoral research-15 min on-line survey

Hello.

I need participants for research on mindfulness and would be extremely grateful if you'd consider being one. Participants need to live in the bay area, and must have had some meditation experience ~ it could be a little, or a generous amount.

The survey is anonymous and can be found at: http://tinyurl.com/6gda3g

Your time is oh! so *appreciated*! Broad smile.

Sincerely,
Kate Leinberger

APPENDIX G

ASPECTS OF MEDITATION SURVEY ITEMS (MEDITATORS)

Meditation:

Primary type of formal meditation practiced:

___ Concentrative

___ Mindfulness

___ Shambala

___ Zen

___ Vipassana

___ Transcendental

___ Blend of different types

Other _____

Typically, on average, how many times do you meditate per week?

0 1-3/month 1-2/week 3-4/week 5-7/week 8-10/week

11-13/week 14-16/week 17-19/week 20-24/week 25+/week

Typically, on average, how much time do you spend in each sitting?

1-3min 4-10min 11-15min 16-20min 21-25min 26-30min

31-40min 41-50min 51-60min 61+min

Approximately how long have you been practicing formal meditation?

1-2 months 3-4 months 5-6 months 7-8 months 9-12 months 1-2 years

3-4 years 5-10 years 11-20 years 21+years

How has meditating impacted your life?

Other comments?

APPENDIX H

FIVE FACET MINDFULNESS QUESTIONNAIRE

Subject number_____

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes <u>your own opinion</u> of what is <u>generally true for you</u>.

1	2	3	4	5
never or very rarely true	**rarely true**	**sometimes true**	**often true**	**very often or always true**

_____ 1. When I'm walking, I deliberately notice the sensations of my body moving.

_____ 2. I'm good at finding words to describe my feelings.

_____ 3. I criticize myself for having irrational or inappropriate emotions.

_____ 4. I perceive my feelings and emotions without having to react to them.

_____ 5. When I do things, my mind wanders off and I'm easily distracted.

_____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.

_____ 7. I can easily put my beliefs, opinions, and expectations into words.

_____ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.

_____ 9. I watch my feelings without getting lost in them.

_____ 10. I tell myself I shouldn't be feeling the way I'm feeling.

1	2	3	4	5
never or very rarely true	**rarely true**	**sometimes true**	**often true**	**very often or always true**

_____ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

_____ 12. It's hard for me to find the words to describe what I'm thinking.

_____ 13. I am easily distracted.

_____ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.

_____ 15. I pay attention to sensations, such as the wind in my hair or sun on my face.

_____ 16. I have trouble thinking of the right words to express how I feel about things

_____ 17. I make judgments about whether my thoughts are good or bad.

_____ 18. I find it difficult to stay focused on what's happening in the present.

_____ 19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.

_____ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.

_____ 21. In difficult situations, I can pause without immediately reacting.

_____ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.

_____ 23. It seems I am "running on automatic" without much awareness of what I'm doing.

_____ 24. When I have distressing thoughts or images, I feel calm soon after.

_____ 25. I tell myself that I shouldn't be thinking the way I'm thinking.

_____ 26. I notice the smells and aromas of things.

1	2	3	4	5
never or very rarely true	**rarely true**	**sometimes true**	**often true**	**very often or always true**

_____ 27. Even when I'm feeling terribly upset, I can find a way to put it into words.

_____ 28. I rush through activities without being really attentive to them.

_____ 29. When I have distressing thoughts or images I am able just to notice them without reacting.

_____ 30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.

_____ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadows.

_____ 32. My natural tendency is to put my experiences into words.

_____ 33. When I have distressing thoughts or images, I just notice them and let them go.

_____ 34. I do jobs or tasks automatically without being aware of what I'm doing.

_____ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.

_____ 36. I pay attention to how my emotions affect my thoughts and behavior.

_____ 37. I can usually describe how I feel at the moment in considerable detail.

_____ 38. I find myself doing things without paying attention.

_____ 39. I disapprove of myself when I have irrational ideas.

_____ 40. I experience myself as separate from my changing thoughts and feelings.

_____ 41. I am more concerned with being open to my experiences than controlling or changing them.

1	2	3	4	5
never or very rarely true	**rarely true**	**sometimes true**	**often true**	**very often or always true**

_____ 42. I am curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations.

_____ 43. I experience my thoughts more as events in my mind than as a necessarily accurate reflection of the way things "really" are.

_____ 44. I am curious to see what my mind is up to from moment to moment.

_____ 45. I am curious about each of the thoughts and feelings that I have.

_____ 46. I am receptive to observing unpleasant thoughts and feelings without interfering with them.

_____ 47. I am more invested in just watching my experiences as they arise, than figuring out what they could mean.

_____ 48. I approach each experience by trying to accept it, no matter whether it is pleasant or unpleasant.

_____ 49. I remain curious about the nature of each experience as it arises.

_____ 50. I am aware of my thoughts and feelings without over-identifying with them.

_____ 51. I am curious about my reactions to things.

_____ 52. I am curious about what I might learn about myself by just taking notice of what my attention gets drawn to.

_____ 53. I think about what will happen in the future.

_____ 54. I remind myself that thoughts aren't facts.

_____ 55. I am able to accept myself as I am.

1	2	3	4	5
never or very rarely true	**rarely true**	**sometimes true**	**often true**	**very often or always true**

_____ 56. I notice all sorts of things and details in the world around me.

_____ 57. I am kind to myself when things go wrong.

_____ 58. I can slow my thinking at times of stress.

_____ 59. I wonder what kind of person I really am.

_____ 60. I am not so easily carried away by my thoughts and feelings.

_____ 61. I notice that I don't take difficulties so personally.

_____ 62. I can separate myself from my thoughts and feelings.

_____ 63. I analyze why things turn out the way that they do.

_____ 64. I can take time to respond to difficulties.

_____ 65. I think over and over again about what others have said to me.

_____ 66. I can treat myself kindly.

_____ 67. I can observe unpleasant feelings without being drawn to them.

_____ 68. I have the sense that I am fully aware of what is going on around me and inside me.

_____ 69. I can actually see that I am not my thoughts.

_____ 70. I am consciously aware of my body as a whole.

_____ 71. I think about the ways in which I am different from other people.

_____ 72. I view things from a wider perspective.

APPENDIX I

TORONTO MINDFULNESS SCALE

Subject number_____

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes <u>your own opinion</u> of what is <u>generally true for you</u>.

1	2	3	4	5
Not at all	**A little**	**Moderately**	**Quite a bit**	**Very much**

_____ 1. I experience myself as separate from my changing thoughts and feelings

_____ 2. I am more concerned with being open to my experiences than controlling or changing them.

_____ 3. I am curious about what I might learn about myself by taking notice of how I react to certain thoughts, feelings or sensations.

_____ 4. I experience my thoughts more as events in my mind than as a necessarily accurate reflection of the way things "really" are.

_____ 5. I am curious to see what my mind is up to from moment to moment.

_____ 6. I am curious about each of the thoughts and feelings that I have.

_____ 7. I am receptive to observing unpleasant thoughts and feelings without interfering with them.

_____ 8. I am more invested in just watching my experiences as they arise, than figuring out what they could mean.

_____ 9. I approach each experience by trying to accept it, no matter whether it is pleasant or unpleasant.

_____ 10. I remain curious about the nature of each experience as it arises.

_____ 11. I am aware of my thoughts and feelings without over-identifying with them.

_____ 12. I am curious about my reactions to things.

_____ 13. I am curious about what I might learn about myself by just taking notice of what my attention gets drawn to.

APPENDIX J

EXPERIENCES QUESTIONNAIRE

Instructions: We are interested in your recent experiences. Below is a list of things that people sometimes experience. Next to each item are five choices: “never”, “rarely”, “sometimes”, “often”, and “all the time”. Please darken one of these to indicate how much you currently have experiences similar to those described.

Please do not spend too long on each item–it is your first response that we are interested in. Please be sure to answer every item.

Never
Rarely
Sometimes
Often
All the time

1. I think about what will happen in the future. 1 2 3 4 5
2. I remind myself that thoughts aren’t facts. 1 2 3 4 5
3. I am better able to accept myself as I am. 1 2 3 4 5
4. I notice all sorts of little things and details in the world around me. 1 2 3 4 5
5. I am kinder to myself when things go wrong. 1 2 3 4 5
6. I can slow my thinking at times of stress. 1 2 3 4 5
7. I wonder what kind of person I really am. 1 2 3 4 5
8. I am not so easily carried away by my thoughts and feelings. 1 2 3 4 5
9. I notice that I don’t take difficulties so personally. 1 2 3 4 5
10. I can separate myself from my thoughts and feelings. 1 2 3 4 5
11. I analyze why things turn out the way they do. 1 2 3 4 5
12. I can take time to respond to difficulties. 1 2 3 4 5
13. I think over and over again about what others have said to me. 1 2 3 4 5
14. I can treat myself kindly. 1 2 3 4 5
15. I can observe unpleasant feelings without being drawn into them. 1 2 3 4 5
16. I have the sense that I am fully aware of what is going on around me and inside me. 1 2 3 4 5
17. I can actually see that I am not my thoughts. 1 2 3 4 5
18. I am consciously aware of a sense of my body as a whole. 1 2 3 4 5
19. I think about the ways in which I am different from other people. 1 2 3 4 5
20. I view things from a wider perspective. 1 2 3 4 5

APPENDIX K

FACET SURVEY ITEMS

FIVE-FACET MINDFULNESS QUESTIONNAIRE

Observe: *Measures attention, both in reference to a variety of internal phenomena (ex. bodily sensations, cognitions, emotions) and external phenomena (ex. sights and sounds)*

When I'm walking, I deliberately notice the sensations of my body moving.

When I take a shower or bath, I stay alert to the sensations of water on my body.

I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.

I pay attention to sensations, such as the wind in my hair or sun on my face.

I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.

I notice the smells and aromas of things.

I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.

I pay attention to how my emotions affect my thoughts and behavior.

Describe: *Applying words or labels to observed phenomena*

I'm good at finding words to describe my feelings.

I can easily put my beliefs, opinions, and expectations into words.

It's hard for me to find the words to describe what I'm thinking.

I have trouble thinking of the right words to express how I feel about things.

When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.

Even when I'm feeling terribly upset, I can find a way to put it into words.

My natural tendency is to put my experiences into words.

I can usually describe how I feel at the moment in considerable detail.

Act With Awareness: *An ability to engage fully in one's present activity rather than act on auto-pilot*

When I do things, my mind wanders off and I'm easily distracted.

I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.

I am easily distracted.

I find it difficult to stay focused on what's happening in the present.

It seems I am "running on automatic" without much awareness of what I'm doing.

I rush through activities without being really attentive to them.

I do jobs or tasks automatically without being aware of what I'm doing.

I find myself doing things without paying attention.

NonJudge: *Taking a non evaluative stance towards thoughts and feelings*

I criticize myself for having irrational or inappropriate emotions.

I tell myself I shouldn't be feeling the way I'm feeling.

I believe some of my thoughts are abnormal or bad and I shouldn't think that way.

I make judgments about whether my thoughts are good or bad.

I tell myself that I shouldn't be thinking the way I'm thinking.

I think some of my emotions are bad or inappropriate and I shouldn't feel them.

When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.

I disapprove of myself when I have irrational ideas.

NonReact: *Accepting thoughts and feelings and not getting caught up or carried away by them*

I perceive my feelings and emotions without having to react to them.

I watch my feelings without getting lost in them.

When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.

In difficult situations, I can pause without immediately reacting.

When I have distressing thoughts or images, I feel calm soon after.

When I have distressing thoughts or images I am able just to notice them without reacting.

When I have distressing thoughts or images, I just notice them and let them go.

TORONTO MINDFULNESS SCALE:

Decentering: *Relates to not personally identifying with thoughts or feelings rather than being overly absorbed in one's internal experiences (Lau et al., 2006)*

I experience myself as separate from my changing thoughts and feelings.

I am more concerned with being open to my experiences than controlling or changing them.

I experience my thoughts more as events in my mind than as a necessarily accurate reflection of the way thing 'really' are.

I am receptive to observing unpleasant thoughts and feelings without interfering with them.

I am more invested in just watching my experiences as they arise, rather than in figuring out what they could mean.

I approach each experience by trying to accept it, no matter whether it is pleasant or unpleasant.

I am aware of my thoughts and feelings without overidentifying with them.

***Curiosity*:** *An individual's general desire to learn more about their experience*

I am curious about what I might learn about myself by taking notice of how I react to certain thoughts, feeling or sensations.

I am curious to see what my mind is up to from moment to moment.

I am curious about each of the thoughts and feelings that I have.

I remain curious about the nature of each experience as it arises.

I am curious about my reactions to things.

I am curious about what I might learn about myself by just taking notice of what my attention gets drawn to.

EXPERIENCES QUESTIONNAIRE:

Decentering: *The ability to observe one's thoughts and feelings as temporary, objective events in the mind, as opposed to reflections of the self that are necessarily true (Fresco et al., 2007)*

I am better able to accept myself as I am.

I can slow my thinking at times of stress.

I notice that I don't take difficulties so personally.

I can separate myself from my thoughts and feelings.

I can take time to respond to difficulties.

I can treat myself kindly.

I can observe unpleasant feelings without being drawn into them.

I have the sense that I am fully aware of what is going on around me and inside me.

I can actually see that I am not my thoughts.

I am consciously aware of a sense of my body as a whole.

I view things from a wider perspective.